# THE BUILDER

## A RECORD OF ARCHITECTURE & CONSTRUCTION

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For Alphabetical List of Firms appearing in this List and References to current Advertisements see page iii.

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# THE BUILDER

*A RECORD OF ARCHITECTURE AND CONSTRUCTION.*

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## ARCHITECTURE, NATIONAL AND CIVIL.

NEXT week we hope to publish the first of a series of short articles, by Professor W. R. Lethaby, under the general title, "A National Architecture." We believe they will be found to be suggestive, but, of course, the thoughts expressed will be personal to the author. It may, however, be taken for granted that all who are concerned with the art of building will sympathise with the view that there should be a heightening of endeavour to improve our towns and to better our ways of building. We need a programme of action. It is suggested that if from the early days of our technical education as architects it was insisted on that architecture was one of the great and essential public services, this in itself would furnish some centre of cohesion and ground for reasonable growth. In the old office training the pupil was to some extent necessarily soon brought up against facts, and the world as it is; but in schools there is a special danger lest architecture be approached as a mystery practised for the gratification of the "taste" of individual employers and designers. As we remarked in a "Note" a week or two since: "We must encourage the view that architecture is a public service rather than a private whim."

**Better and Nobler Towns.**

It will be admitted without much argument that our towns are not good enough. Even if no charge be brought against them, we may agree on that. They are not good enough, and it would be an ambition worth while for us all to attempt to make them better and still better and nobler and fuller of fine forms of life. Architects may be "suspect" as working for their self-interest, but this cannot be helped. A similar difficulty applies to others too, and all alike have to live it down by doing true work in the public service. Architects more than any others hold the knowledge of city traditions, and they should have a sense of the quality proper for city structures. This being so they must find a way of bringing their special knowledge into the common fund. In several towns, committees for civic amelioration have been established, and in America large matters of public concern are submitted for their advice. It may be suggested that architects might specially interest themselves in the formation of such committees in all our towns. Such bodies would everywhere seek to induce a keen public sense of order, perhaps ultimately—for which they may have to wait—of beauty. The children in the schools should be interested in the history, monuments and amenities of their towns; a spirit of local patriotism should be brought out, and they should be definitely trained as proud citizens. We are brave and proud; then we must set about—and that eagerly and immediately—the works meet for pride and love. The spirit of emulation must be called out. If we lived in a world by ourselves we might elect to exist as we pleased, but it is certain that we cannot live both within and outside civilization at one time. We have then, as a matter of life, to maintain a fair position in all matters of international interest, and to do this we must even aim at leading. We must try also to set up local emulations between town and town—such endeavours and interests are matters of life, not merely of taste. Civilisation is fine forms of life in fit cities.

**Tidying-up and Advertising.**

The great danger always before us is that of being giddily betrayed to some one dazzlingly architectural effort which will fail. It is not a time for extravagance; our activities should rather be directed towards general and obvious improvements, a distributive policy of betterment all round and all the time—"cleaner streets," as Professor Lethaby himself has already urged, more planting of trees, and a better control of large public advertisements. The public and semi-public services, like the post offices and railway stations, might easily be bettered just as they are if only it was someone's business to say "this is shamefully untidy and must be tidied up at once." A marvellous improvement might be made in a few years just by cleaning, straightening, planting, painting, limewashing, improving street lettering and regulating public posters. On this last matter it may be suggested that some control would be beneficial even to advertisers themselves, for at present they have to compete against one another without limit or be swamped. It seems a matter analogous to hours of employment and Bank Holidays—an umpire is required in the interest of the competitors themselves. In any case the right of the ordinary citizen to be protected from offence in public places has been too much forgotten, and we venture to commend to all town authorities consideration of these questions of town manners from the point of view of comparative civilisation. In work for the betterment of our towns the Royal Institute of Architects would find a proper and dignified sphere of action, and such work would best explain the true function of the architect to the public.

**The Minor Necessities of London.**

In every city or town there are, at every moment of its history, things which should most certainly be done, but we fail in the machinery for getting them done. In London, for instance, altogether outside the great things which may be talked about, there are hundreds and thousands of minor matters and necessities which remain undone, and we need some means of getting them done. Here the Press might do a great service if they would maintain a steady pressure for a decent level of public utilities. The actual state—apart from war conditions—of any important part of London is almost unbelievable unless one goes specially to look at the facts. The question how well-instructed advice can be brought to bear on the old Town Corporations calls for very serious thought, and it might be considered whether expert advisers of the type of the Oberburgomeister are not desirable. In any case it is most essential that in making public appointments, men of competence from high planes of judgment should be selected. The whole educational system will be an absurdity if our authorities will not employ the educated.

**"Art Accidents."**

In the way we have looked at things in the past, architecture has seemed an accident—in some ages there happened to be "great architects," and in some others there happened to be none. We were never told that these great architects were like the genii in the Arabian Nights—slaves of the lamp—and always had to come when they were wanted. Pericles wanted Phidias and St. Louis wanted Pierre de Montreuil, and they came. The essential thing is to want enough; to have "a will to civilization." The noble cities of the past—Athens, Rome, Florence, Venice, were not art accidents; they were consciously produced monuments of civilization. The exact relation of factors does not, of course, always remain the same; social organization, religion, romance, adventure, all alter from age to age. For ever, however, there are constants, and a high-strung, trained and noble people cannot for long elect to live in slovenly and disorderly towns. Always the body of a town must represent the spirit of the town; and always as the Greek said, "the City teaches the Man."

# NOTES.

**Restorations as War Memorials.**

It is well that the public should continue to be reminded of the inadvisability of adopting unsuitable schemes by way of war memorials. Mr. Arthur F. C. Leveson Gower calls attention in the *Times* to the dangers attending the proposal to restore the village crosses, whose bases may be found in so many parts of the country. This certainly appears to be a most unhappy suggestion, which, we hope, will be abandoned. No doubt, in a matter of this sort, it is far easier to condemn inappropriate ideas than to put forward suitable ones, and those who wish to erect memorials may well think that suggestion is the better part of criticism. It seems probable, however, that everyone will agree this is pre-eminently a case in which it is far better to do nothing than to do the wrong thing. At the present moment the important thing is to prevent the wrong thing being done under the influence of emotion seeking immediate satisfaction; and after all, there is plenty of time to find the right thing. In the meantime, we do not want to see a crop of memorials springing up all over the country only to be condemned later on as meaningless and absurd.

**The Immortality of Inept Design.**

The difficulty then arises that anything in the nature of a memorial has become invested with a sacro-sanctity having no relation to its suitability or to its merits as a design. The most inept and barbarous of designs may thus have a species of immortality thrust upon it, which renders its removal most difficult, if not unthinkable. However regretfully future generations realise the mistake, however clearly they perceive what ought to have been done, however keenly they resent the presence of an artistic anomaly, sentiment is sure to be too strong to permit its removal. Were it not for this sentiment, we might see an extensive weeding out of our London statues, beginning, perhaps, with the Nelson monument in Trafalgar-square. But whatever the defects of such monuments may be, they are, at least, genuine monuments in their own way and not mere restorations. Surely we can find a better way of expressing one idea than by restoring a monument that originally expressed another.

(See next page.)

**Town and Village War Memorials.**

We notice the suggestion that local authorities and committees in towns and villages should not be given a free hand with regard to the designs of war memorials, but that their actions should be controlled by some central body of qualified persons. This raises a question of considerable magnitude upon which opinions may possibly differ. Owing largely to the fact that a private building may be and often is a public nuisance, a very strong feeling has lately developed in favour of the architectural control of our cities. Indeed, we see it applied already, here and there, in varying degrees, according to circumstances. Granted that properly exercised control is beneficial, there appears no reason why it should not be extended to the country. The same arguments seem to apply. The beauty of the country village, or small market town, though differing in its nature from that of the capital city, is yet just as much the property of the whole community; and, seeing how much unspoilt beauty still remains in the country, there may be an additional reason for exercising such control as would tend to preserve it.

**Architectural Control.**

Although the balance of opinion seems inclined to turn in favour of the principle of architectural control while present conditions last—if only as a measure of public self-defence—there must be many who think this principle should be applied with very great discretion in the case of war memorials. Control by an outside authority has its dangers. It is apt to ignore local susceptibilities and points of view, to damp enthusiasm and crush out initiative; and local war memorials are nothing if they are not the natural and spontaneous expression of local feeling. There is a fundamental difference also between the motive which inspires their inception and that which prompts the erection of a building, or the development of an estate as an investment or a commercial enterprise. Control has been found necessary, to prevent private interests over-riding those of the whole community; but, if a public committee errs, it will be from ignorance and not from greed. It is private greed that requires strict control; ignorance needs help, guidance and advice. This can be obtained from any competent designer or from the Committee initiated for this purpose by the Royal Academy. If local authorities must be controlled in the sense of being compelled, let them be compelled to ask advice as to the nature, position and design of the memorial, and to place the whole matter in the hands of some one qualified to deal with it.

**The Housing Problem.**

A conference was held in London on Tuesday between representatives from the Federation of British Industries, who are dealing specially with the housing question so far as it applies to the large industrial centres, and representatives from the Labour side of the National Alliance of Employers and Employed. The discussion, we learn from the *Morning Post*, ranged round a scheme for supporting Public Utility Societies as a means of helping to provide housing accommodation, the proposal being to encourage their formation as an addition to municipal and national housing schemes, it being realised that the longer the war continues the greater difficulty there will be for the State or local authorities to undertake the whole responsibility for the provision of the necessary accommodation.

**Public Utility Societies.**

It was suggested that this form of society is peculiarly well suited for the provision of housing accommodation for several reasons, among them being that it will enable employers to contribute by means of loan stock towards the provision of accommodation for their workpeople without involving the disadvantages of the "tied house system," in which employees are housed in houses owned by the employers. Moreover, it makes it possible for the control and management of the houses to be in the hands not of the employers but of a Joint Committee on which the tenants, local Trade Unions, contributors of capital, and others keenly interested in social up-liftment can be represented. It will enable several employers in a district to join together, where acting independently they would probably not be in a financial position to take any action at all. The whole of the advantages of the Public Utility Societies would thus accrue, the working man would retain his independence, the master would realise that his men were housed in satisfactory conditions, and the whole of the community would benefit by the general social up-liftment. The financial side of the scheme was fully discussed, and finally the scheme was adopted, the Labour representatives present agreeing to help in every possible way. The conference decided to ask Mr. Hayes Fisher to receive a deputation before the Government Housing Scheme is definitely adopted. These proposals have in the

FROM THE PICTURE BY WM RENISON ROYAL GLASGOW INSTITUTE OF FINE ARTS 1918 EX.

main already been made in the *Builder* by Mr. Percy B. Tubbs, F.R.I.B.A., in a letter in our issue for January 4th.

**Private Enterprise and Housing.** WE have always maintained the importance of encouraging private enterprise, and it will be of serious import if the result of war restrictions and legislation prevents its proper development. As a striking contribution to this important aspect of our national life we must quote the remarks of Mr. Jas. Wright, a well-known building trade employer. After dealing with the costly Government experiments in housing for war workers, and pointing out the danger of thinking for a moment of a national housing scheme on such uneconomic lines, Mr. Wright says:—"Figures obtained from various municipal authorities, collated and published by Mr. A. W. Shelton, prove conclusively that prior to 1910 private enterprise built more houses than were required—more, in fact, than the Walters Committee recommend as necessary at the present time. There would have been no shortage of houses—the war effects excepted—but for ill-conceived, inept, and unjust legislation; and until this is removed or so amended as to restore confidence in house property as a safe investment the housing difficulty will remain. Expensive subsidised schemes may temporarily relieve the difficulty; they will not solve it. but intensify it in the future by increasing the rates, and so make economic building impossible. True progress in this, as in all things else, can only be made on sound business and economic lines, and not by schemes or methods which result in continuous waste of money and human effort, for economy is the soul of progress."

**Builders and Private Enterprise.** ONE cannot help but wonder whether full justice has been done to private enterprise in providing housing accommodation for the people, if the speeches at the opening of the Bradford Stone Exchange fairly represent the facts. One speaker claimed that if builders could have the same terms as corporations were being offered, the housing difficulties would be solved The President of the Exchange (Mr. George Wilkinson) said that the large manufacturers had not come forward as purchasers on behalf of their workpeople; and the builders, having no sale, had given up building. For some reason no money had been put into houses for the past ten years, and the stone trade had almost "winked up." If private enterprise had failed to build houses, it had also failed to purchase them.

**Exhibition of [Queen Mary Relics.** THE exhibition of relics of Mary Queen of Scots, which is being held in the Library at Langside, Glasgow, on the site of the battle of 1568, is a very interesting one, and is due, we believe, to the inception of Mr. Ludovic Maclellan Mann, who has written a pamphlet about it, published at 5s., for the benefit of the sick and wounded in the war. The objects have been carefully selected so as to secure, as far as possible, such as have a genuine history. The vigorously carved frame which we illustrate, is a good example of the rococo work which did duty in such varied forms for picture frames and often with fine decorative effect.

**The Glasgow Institute Exhibition.** THE City of Glasgow has reason to be proud of its M'Lellan Galleries in Sauchiehall-street, for they certainly rank amongst the best in the kingdom both as regards arrangement and general architectural effect. The approach hall and staircase are ample and dignified and the decorative quality is agreeably felt over the whole design. The fifty-seventh exhibition of the Glasgow Institute of Fine Arts, which was opened in these galleries this week, is a very attractive one, containing 689 works. The staircase hall landing contains a small but very interesting collection of sculpture; whilst the pictures include not only many admirable representative works by leading artists from the whole kingdom, but some particularly good works by Scotch artists. The architectural work is almost entirely of a pictorial nature, there being only about half-a-dozen examples of anything representing recent design. Amongst them are the Gourock Municipal Buildings by Mr. Alex. N. Paterson, A.R.S.A., which is a pleasing Renaissance building, and the illustration by an excellent pen-and-ink view of the striking improvement scheme for Glasgow designed by Mr. Thos. L. Watson F.R.I.B.A. The Iona Cathedral, by Mr. P. MacGregor Chalmers, I.A., a bungalow by Mr. Andrew Robertson, A.R.I.B.A., and a frame of photographs of Hinton House, Northamptonshire, by Mr. Jas. A. Morris, A.R.S.A., are about all to be noted as current architecture. From an excellent picture of the old tolbooth at Crail, by Mr. Wm. Renison, in Gallery 8, we give a slight sketch, which shows how well the painter has emphasized the sturdy breadth of this fine old tower. There are several notable pictures in the galleries, such as "The Macnab," by Raeburn, lent by Sir Thos. Dewar; "The Studio of the Painter," by Sir John Lavery; Anton Mauve's "Scheveningen"; fine landscapes by Sir David Murray, Julius Olsson, E. A. Walton, J. Campbell Mitchell, Adrian Stokes, and J. Coutts Michie. Much might be said in detail of an exhibition containing so large a number of admirable pictures. One is inclined to wonder whether "The Angel of the Resurrection," by the late Albert Hodge, will find a permanent home in Glasgow.

**Cob-Building.** IT was suggested at a meeting of the Devon Education Committee that cob-building may be revived with advantage. Lord Portsmouth thinks that definite instruction might be given in classes for this special purpose, for he thought the work could well be adapted for cottages in country districts. It had claims over stone and brick, being far drier than stone. There are cob-built houses in his neighbourhood in North Devon which are certainly six or seven hundred years old. He doubted if reinforced concrete would be cheaper. The discussion which followed Lord Portsmouth's speech on the occasion. did not very largely support the value of the work, but the opinion was expressed that even if it were not allowed for cottages it might be adopted for farm buildings. At all events, Lord Portsmouth's motion that the County Council be asked to make a grant towards forming a class for cob-making construction was carried.

FRAME OF PORTRAIT OF QUEEN MARY
LENT BY SIR J. MAXWELL STIRLING MAXWELL
EXHIBITION OF RELICS OF MARY QUEEN OF SCOTS
LANGSIDE GLASGOW Sep 1918

# GENERAL NEWS.

### Stonehenge for the Nation.

Through the generosity and public spirit of Mr. C. H. E. Chubb, of Bemerton Lodge, Salisbury, the owner, Stonehenge is to become the property of the nation.

### University of Manchester Faculty of Technology.

We have received the prospectus for 1918–19 of the University courses in the Municipal College of Technology, Manchester, which is of considerable interest. Parents and all interested would do well to procure a copy of the prospectus from the College. The Michaelmas term will commence on Monday, October 3 next. Students will be enrolled on September 30 and following days to October 2.

### Professor of Design in the Royal College of Art, London.

Mr. R. Anning Bell, A.R.A., of the Glasgow School of Art, has accepted the appointment of Professor of Design in the Royal College of Art, London, in place of Professor Lethaby, who has resigned. We understand that arrangements have been made whereby Mr. Bell will retain his post as Professor of Design in Glasgow, paying a series of visits during the school session and generally supervising the work of the Design Section.

### Boys' Welfare Association.

The Boys' Welfare Association, which has been established for the encouragement and assistance of employers in promoting the welfare of their young male employees, has already made progress, many engineering firms having joined as members. An influential council has been formed. The hon. treasurer is Mr. S. E. Alley (Sentinel Waggon Co., Ltd.) and the Rev. Robert R. Hyde is the director. The offices of the Association are at Sanctuary House, Tothill-street, S.W. 1, where all enquiries should be addressed.

### Road Transport Order, 1918.

The Secretary of the Commercial Motor Users' Association has communicated with the Road Transport Board with reference to the position in which the numbers which have been issued by the Board, and which have to be displayed upon the vehicles, should be placed, and has received a reply from the Secretary to the Board stating that so long as vehicles are legibly marked with the transport registration number the Board do not intend to insist that the number should be placed in any particular position. It is however suggested that the number should be marked on the near side of the vehicle following the name and address which is already, in most cases, thereon.

### Ireland's Native Resources.

A correspondent calls attention to the importance of stones quarried in Ireland for foundations. Many building works are suspended because cement cannot be got in war time, and architects almost always specify concrete foundations nowadays. Our correspondent has awakened some architects to the satisfactory and enduring foundations in stone before concrete was thought of, and asks for a revival of the old building ways, at all events, whilst the war stops imports of cement. Many buildings would now be complete, the foundations of which have not yet been laid owing to the difficulty of getting cement. Flags are also available in this country for footways, some of the finest flags in the world being found in Ireland.—*Freeman's Journal.*

### The Old Infirmary Site, Manchester.

The Manchester Royal Infirmary Old Site Committee met recently to advance, if possible, a settlement of the long-standing question of what shall be done with the former site of the Royal Infirmary. The Art Gallery Committee and the Libraries Committee were asked some months ago to state their views on the subject and their requirements in the event of its being decided to erect a reference library and an art gallery on the land. The reports on these points were expected to be ready at the end of February, but the Site Committee are still waiting for them. Early in June there was a meeting of the Art Gallery and Libraries Committee, and it was then stated that the idea of having a joint library and art building on the site had been abandoned. The accuracy of this statement was, however questioned at the time by Alderman Plummer, chairman of the Libraries Committee. Since then nothing has been said publicly on the subject, but we believe that the idea of having only one building on the site, and that an art gallery, is growing every day. The Site Committee passed a resolution calling upon the Chairman of the Art Gallery and Libraries Committee for the reports asked of them last January.—*Manchester Guardian.*

### Jerusalem's New Water Supply.

The *Times* recently printed a description of the new water supply of Jerusalem, which Mr. W. T. Massey communicated to our contemporary. In the course of his remarks the writer says :—" For its water Jerusalem used to rely mainly upon the winter rainfall to fill its cisterns. Practically every house has its underground reservoir. But many had fallen into disrepair, and most of them required thorough cleaning. To supplement the cistern supply the Mosque of Omar reservoir halved with Bethlehem the water which flowed from near Solomon's Pool down an aqueduct constructed by Roman engineers under Herod before the Saviour was born. This was not nearly sufficient, nor was it so constant a supply as that provided by our Army engineers. They went farther afield. They found a group of springheads in an absolutely clean gathering ground on the hills yielding some 14,000 gallons an hour, and this water, which was running to waste, is lifted to the top of a hill, from which it flows by gravity through a long pipe line into Jerusalem. Supplies run direct to the hospitals, and at stand-pipes all over the city the inhabitants take as much as they desire. The water consumption of the people has become ten times what it was last year. The scheme does not stop at putting up standpipes for those who will fetch the water. The water level of the cisterns is low, and as they are getting emptied, the authorities arrange for refilling them on the one condition that they are first thoroughly cleaned out and put in order."

# CORRESPONDENCE.

### Government Building Contracts.

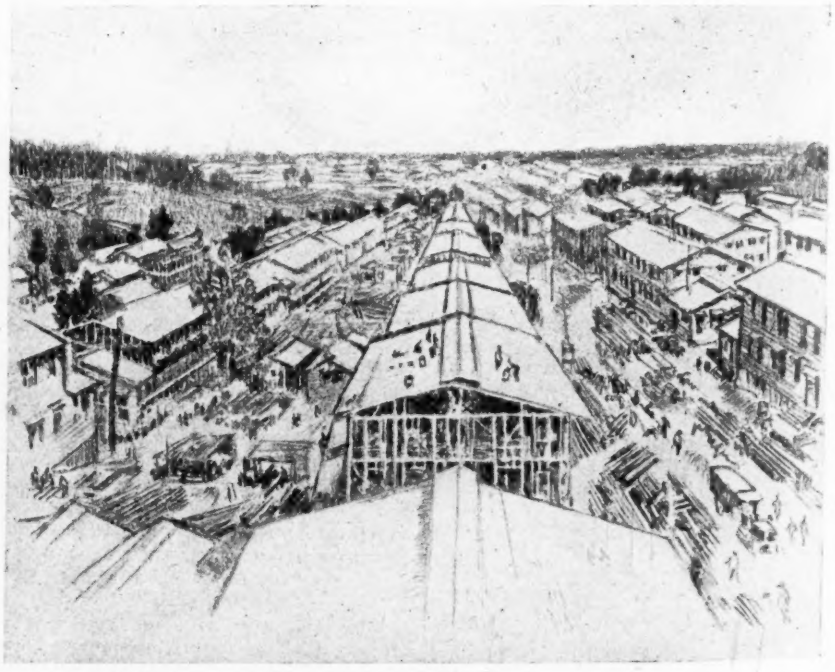
SIR,—The letter to the *Times* from several well-known quantity surveyors quoted in the BUILDER for September 13, is of considerable importance. The system of which complaint is made has arisen largely from the practice of various Government departments competing against one another in the labour market, and offering ever increasing inducements to men to forsake the work upon which they were engaged to go to other work in which that particular department was interested, and also of frequently putting gentlemen in charge of very large building works who had had no previous experience of such work. The result is that at the present time no contractor cares to bind himself to carry out work for a definite sum without stipulating that he is to be repaid any increase in rates of wages or in the price of the principal materials that may take place while he is carrying out the contract.

The letter, however, raises another question. In theory, no doubt, the system of obtaining competitive estimates for building work is the fairest to all parties concerned, but, as practised during recent years, it is not always so. Anyone acquainted with London building work looking down the list of tenders published in your columns week by week before the war would notice that frequently firms of unequal merit tendered for the same job. This inevitably led, where competition was keen, to the successful contractor quoting such a price that with no margin whatever for the inevitable uncertainties involved in building work, he was tempted to scamp the work in order to get through without loss.

Consequently, some modification of the system would seem to be desirable, and I would suggest that a committee of members of the architectural and surveying professions be formed to consult with the master builders on the subject.

I venture to think that if it could be agreed that not more than six firms be invited to tender for any particular contract, and that it become the universal practice to submit the priced bill of quantities with the tender for examination by the surveyor for him to report to the architect, many of the drawbacks to the system would be obviated.

At the same time it might be desirable to draw up lists of firms for different areas, stating the limit of size for which such firms were prepared to tender, as is done in the case of some Government departments. "INTERESTED."



**The Camp: The New Architecture.**
From "Pictures of War Work in America," by JOSEPH PENNELL. (See next page.)

## BOOKS.

*Joseph Pennell's Pictures of War Work in America.* (Philadelphia and London: J. B. Lippincott Co. Price, 9s. net.)

THIS is a collection of reproductions of a series of lithographs of munition works made by Mr. Pennell with the permission of the United States Government, with notes and an introduction by the artist. Most Englishmen are familiar with the author's drawings of factories and works and ship-yards in this country; and also his earlier drawings, recording the wonder of work—many of which are admirable in their poetic suggestiveness and treatment. And the American collection is of equal interest, though some of the drawings have suffered in reproduction. Several are specially interesting, such as No. 14, "In the Dry Dock"; No. 16, "Submarines in Dry Dock"; and No. 36, "The Camp: the New Architecture." Of "The Camp," the author says: "In the centre of the new city is something like a long train of box-cars—yet when you see their sides you find they are houses. As you look, they grow—and, from a few holes in the ground till the building is finished takes about forty-five minutes, the architects tell me. They are better built than the English munition towns; they are unbelievable, these cities of 50,000 inhabitants, built while the army was formed. This drawing is but a bit of one of them—to right and to left and behind the town stretched, the embodiment of usefulness, respectability—a triumph of ugliness and energy."

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*Works Lighting.* By D. H. OGLEY, B.Sc. (London: Iliffe & Sons, Ltd., Tudor-street, E.C. 4. 7s. 6d. net.)

THE author of this admirable little work refers to the appointment of the Government Committee to enquire into the whole subject of industrial lighting as one of the most important events of recent years from the point of view of lighting progress, and he is no doubt right. As he says, the recommendations of that Committee are of vital importance, "since there is no longer any doubt that the degree of comfort in the working conditions is largely determined by the adequacy of the lighting. Manufacturers, without exception, cannot but agree with the suggestion that there should be a statutory provision (*a*) requiring adequate and suitable lighting in general terms in every part of a factory or workshop; and (*b*) giving power to the Secretary of State to make orders defining adequate and suitable illumination for factories and workshops."

How great is the influence of lighting may be instanced by a recorded case of a factory in which the output of a night shift was increased by over thirty per cent. by the introduction of an efficient system of lighting. At the present time, when the conditions of the industrial worker are receiving such close attention, the appearance of an authoritative work on the subject of factory lighting is most opportune. "Works Lighting" has been compiled after careful consideration of all the existing practical lighting systems, with the view to assisting the manufacturer in deciding upon the most suitable form of illuminant for any particular purpose. The preface to the book has been contributed by Professor E. W. Marchant, D.Sc., Liverpool University, himself a well-known authority on works lighting.

"Light," says the author, "is indeed the most important tool placed at the disposal of the workman, for without light all other tools are useless," and it is on this text that the book has been based. After showing by statistics and other means how accidents and wastage are prevented by efficient lighting, chapters are devoted to the development and progress of gas lighting and electric lighting; and modern practice in both illuminants is described, and amplified with illustrations and diagrams to show various methods now in use and their respective values for specific purposes. A useful section is devoted to the measurement of illumination with formulæ to decide the number, position, size and distance of lighting units, and the choice of reflectors—a description of the types of which is given.

## INDIAN PUBLIC WORKS.

FOR some years past there has been a growing feeling that in many ways the official buildings of India have not been carried out under the most satisfactory conditions, and that they fell short of the standard that ought to be achieved, when it is considered that they represent the larger proportion of all the important buildings constructed throughout that portion of India under Government control.

They too often fail in providing the most appropriate accommodation practically arranged and oftener still in clothing this accommodation in expressive and characteristic forms of design. Now as far as this criticism applies to architectural failures not confined to India it casts no particular reflection on Indian methods. Absolute perfection is nowhere to be found, but the impression remains that the work in India is inferior to that of Europe, and this inferiority is the more marked owing to the proximity of buildings of many ages, all distinguished by the vigour of their architectural quality.

The question whether the best designs can be obtained by what we know as the independent architect, as if an architect ever can or ought to be independent, and the architect working under organized control is too complex a one to be argued out here. A measure of independence conduces to vitality, but independence in the essential points might be, though it rarely is, preserved under a system of organized employment.

We are still too remote from such a consummation to render a discussion on the point of more than academic value, as it is many stages beyond that at which the Indian Public Works Department rests at the present moment. The Public Works Department was first organized in 1854, prior to which the buildings required were carried out mainly by military engineers as a sort of side-line to their usual avocations. With a few brilliant exceptions, the results, as may be imagined, were not impressive, and the establishment of the new department marked an advance in technical achievement. Despite this, buildings still remained the Cinderella of the office, as in 1866 we find that in subdividing the Department three sections were formed to deal with military works, irrigation and railways.

Subsequently the military works branch was taken from this department, and in 1905 the railway branch was also separated, so that there only remained a body originally organized with a view to irrigation schemes and their maintenance, but which had incidentally been entrusted with the construction and care of all Government buildings—partly under Imperial control, as in the case of post-offices and customs houses, and partly under control of the nine provincial governments, as in the case of their own offices, law courts, police stations, colleges, hospitals and the like.

Now for a long time all these buildings were designed by engineers, selected without reference to any special qualification for building work of this class, and it is only within comparatively recent years that architects were appointed to advise the Public Works Department on their more important undertakings. Even then their functions were mainly advisory, their work (except in the Bombay Presidency) not including any supervision of the execution of the buildings they designed. They have all along been regarded as somewhat of a supplementary decoration to the department, and this attitude is more or less reflected in the terms of their appointment as "consulting architects" outside the regular scheme of promotions, pensions, &c. This has naturally been felt as unfair by the architects so appointed, and without committing ourselves to the view that the best work is produced under official auspices, it is impossible not to sympathise with those who are placed under the inevitable disadvantages, without securing the full measure of the usual advantages of a departmental office.

Leaving this point we come to the question of how far the Indian public was receiving the best possible service under the existing system, and it was doubtless mainly due to criticisms levelled at this, that the Governor-General in Council decided in November, 1916, to appoint a Special Committee to investigate the procedure of the Public Works Department. This Committee's report deals in a comprehensive manner with the entire organization of the Department and makes a number of suggestions of undoubted value. In the first place it proposes a definite move in the direction of devolution, thus anticipating the more recent Montagu report in giving increased powers and responsibilities to the District Boards. Attention is next directed to the encouragement of private enterprise, though its recommendations here are limited to the business aspects of building, and do not cover any programme for encouraging the formation of an independent professional body. Indeed its conclusions may be regarded as adverse to this, as witness the following extract:—

It has also been suggested that Government architectural work should be thrown open to competition by private architects, but owing to the lack of interest in the development of architecture on its artistic side in India at present we cannot support this proposal, although we recognize the suitability of such a system for such important projects as the new capital at Delhi, the Victoria Memorial in Calcutta, and any special case where the local Government considers it desirable to invite outside assistance, and where the field of competition will not be confined to India; but as a general rule we consider that, provided sufficient work exists for a wholetime officer, the system under which Government maintains its architects, sanitary and electrical engineers is, for the present, suitable.

The next important recommendation is that for the division of the Department into two branches, one dealing with irrigation and the other with roads and buildings; this has hitherto only been done in the United Provinces and in the Punjab. It would have been thought that the desirability of some such division was obvious enough on technical grounds, but it is not advocated very emphatically, and mainly on the score of convenience in fitting in with the scheme for the transfer of minor works to local bodies.

Further on the Committee gives its verdict very justly against designs for all work being prepared in a central office which would exercise no powers of controlling the execution of the work, rightly preferring that design and supervision should go together. At the same time, in making a claim for the increased use of local knowledge, it points out that the advantages of the central designing office "are already largely met by the adoption of standard plans," a curiously illogical argument, seeing that the use of standard plans must nullify the advantages of local experience. Indeed the standard plan or "type design" is one of the most objectionable features of Indian building practice, and it is greatly to be regretted that the Committee seems to have tacitly accepted it. It need hardly be mentioned that there was no architect member.

Passing on to the Committee's proposals in respect to the Consulting architects, it behoves us to review these in more detail. The architects urged that they—

are cut off from one of the main functions of their profession, namely, the supervision of the

construction of their buildings, and that this divorcing of design from execution is inimical to the best interests of architecture in India, since design, if separated from construction, is apt to lose its vital relation to actualities, its touch with material and with the appropriate and economical use of it. Also that the efficiency of building work in general is reduced by inserting between the architect and the work an independent control which owes no allegiance or responsibility to the former, and that the Indian system is altogether opposed to the practice in force in more advanced countries, where the architect retains complete control during construction of his works.

In Bombay only is the consulting architect in charge of the construction of Government buildings designed by him, and the Committee affirms that this arrangement has proved satisfactory ; it does not, however, feel that its advantages justify the establishment of a distinct architectural branch of the Public Works Department, considering that it still remains more economical to leave to the local engineer the task of supervising the smaller buildings distributed about the country. While we may doubt the accuracy of this conclusion, and challenge the assumption that the monetary consideration should be the sole arbiter, we may at least endorse the expression of opinion that follows it :—

We consider, however, that it should be recognised that the supervision of building construction is an important portion of the duties of an architect, and we recommend that, in large centres such as presidency towns or other places where Public Works Department divisions exist for building purposes only, and where it is probable that sufficient work of this nature will continue indefinitely, a staff of architects should be maintained and entrusted with the executive charge of the work, the cadre of engineers being correspondingly reduced. A similar arrangement should be made elsewhere when a building is to be constructed of sufficient importance to justify a separate sub-divisional charge.

We consider that the architect should take the same responsibility for structural stability as is taken by an executive engineer in the case of projects prepared by him. It is the officer who prepares the designs in the first instance who is in the best position to detect engineering defects, and the fact that the estimate and plans have to be approved by the superintending or chief engineer should not be held to relieve him of his duty in this respect. Although these latter officers are required to satisfy themselves of the soundness of any project before giving their approval, it is impossible for them personally to examine and check every detail, and while they should undoubtedly be required to bear their full share of responsibility, the primary responsibility should rest with the officer who prepares the original plans, be he engineer or architect.

This recommendation implies a large increase in the architectural staff of the Public Works Department, and it is advised that in future the qualification for the post of consulting architect should be Fellowship, and for that of assistant architect, Fellowship, or Associateship (plus three years' office experience in Europe) of the R.I.B.A. It is suggested that the consulting architect should be appointed, as at present, on a five years' agreement, but that on the termination of this, if he has proved satisfactory, and if there is sufficient work he should be transferred to the permanent establishment. The Committee was, however, divided on the question of offering the same terms to assistant architects, the majority, rightly, we think, favouring five-year agreements only in order that this class may drift out into private practice in India, and thus allow of the more frequent introduction of new blood into the establishment, and avoid the stereotyping so dangerous to progress in a rigidly organized development.

The Committee deals in considerable detail with the present engineering colleges in India, and recommends various improvements in the courses and methods of training. In regard to architecture the conviction is expressed that at least one good school is needed, and Bombay is indicated as probably the most suitable centre. Reference is directed to the following memorandum from the R.I.B.A., which we print *in extenso*.

### APPENDIX C.

Memorandum from the representative of the Royal Institute of British Architects :—

The Viceroy outlined a policy of decentralisation in respect to the design and supervision of official buildings, by which much of this work would be in the charge of the district boards instead of the Provincial P.W.D. The reference to the committee suggests that the matter has been visualised primarily from the administrative standpoint.

Now, though this aspect is important, it is by no means the only one to be taken account of. The assumption that the present highly centralised control of buildings does not give the best results may be unhesitatingly accepted. Those qualified to produce good designs are not able to see that they are properly carried out, while those entrusted with the latter duty, having many other classes of work to attend to, are not sufficiently experienced in buildings.

Apart from this there is another point, namely, that India is sadly in need of those capable of designing and constructing buildings. Except in a few favoured districts, where the craftsmen still maintain the old traditional methods of building, these traditions have lapsed and nothing of equal value has taken their place, nor even where the tradition is well maintained does it quite meet all the requirements of modern developments. It may, therefore, be affirmed that much of the building work, public and private, is deplorably bad.

The concentration of public work has discouraged many competent men from taking up building from the professional or the business aspect, and both municipalities and private individuals find the greatest difficulty in getting building works artistically and skilfully carried out.

It may be assumed that one of the objects of the proposed scheme is to provide that every district shall be provided with capable designers and skilled constructors, but it does not seem to be fully realised that a mere revision of administrative methods will be of little use without active measures for the provision of qualified men. Without these no advance can be made. Such a body does not exist at the moment ; it would have to be imported or trained. We need not go into the question as to whether recruits to it would be mainly European or Indian. The European would probably be required at first on account of the small number of Indians that have qualified themselves for this work, but it must be remembered that while the Indian may require training in architecture and construction, the European requires training in Indian conditions.

The success of the Indian in law and medicine suggests that, given the necessary incentive, he would master the art of architecture. That so few have done so in recent times is partly due to the fact that no suitable training is provided. Almost the only form of education open is on strictly European lines, and these cut so sharply across the Indian conception of building that the student becomes confused and baffled. If this education could start from the knowledge possessed by the Mistri of Southern India and from that basis could be built up the wider knowledge demanded by modern requirements and materials, we might expect to secure the best type of exponent of a genuinely Indian architecture.

This procedure would naturally be only practicable in the case of one bred in India, and we must also consider the case of the European prepared to qualify for practice in the East. In his case he would probably have acquired his knowledge by means of the methods accepted here in England, and would need to supplement these by a sound study of Indian conditions and how these express themselves in building.

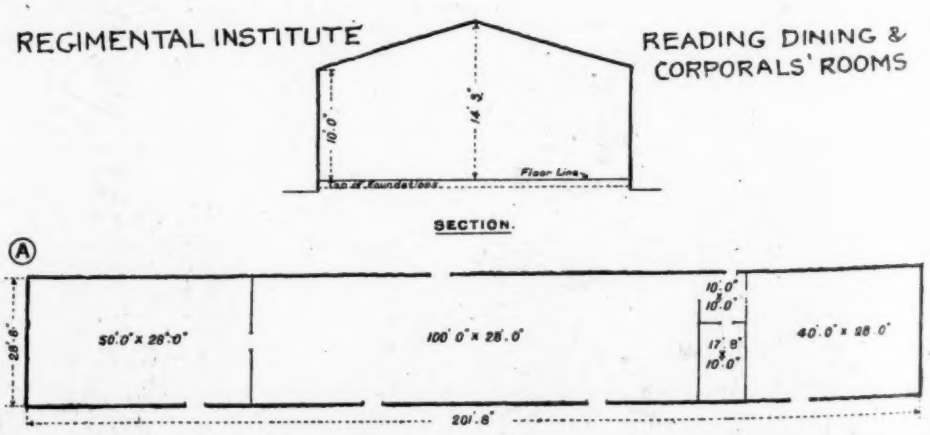
If his training has been on broad lines he should be capable of this adaptation, but some direction should be given him beforehand by one experienced in Indian requirements so as to save him time in his Indian career. In either case a bare mechanical knowledge of building can do nothing towards vitalising methods of design in India.

Under any circumstances it would be desirable to strengthen the training in architecture in the principal centres of India by the development of existing schools and the establishment of chairs of architecture in the universities, with a curriculum including not only the scientific basis of structure but also the principles of design, for which illustrations may be drawn from the history of Indian art quite as profitably as from that of European countries.

Assuming that a number of well-qualified men were thus made available, it would be only fair that there should be some reasonable guarantee for their employment, and it may be suggested that this should be met by appointing them as consultants, &c., to district boards and municipalities with moderate retaining fees or other suitable methods of remuneration in return for srevices required by these authorities, but leaving them free to take up private work to an extent that did not interfere with their public duties.

The success of an administrative change such as this depends so largely on the means to be employed to meet its requirements from the technical point of view that a sound system of training, which cannot be said to exist at present, is an essential factor in the achievement of the results aimed at.

H. V. LANCHESTER.
*For the Royal Institute of British Architects.*




**Temporary War Buildings for School Purposes after the War.**—(*See page* 191.)
*By permission of the Board of Education.*

# TEMPORARY WAR BUILDINGS FOR SCHOOL PURPOSES AFTER THE WAR.

THE following Circular has been issued to Local Education Authorities by the Board of Education.

1. The Board of Education have been in communication with the "Lands and Buildings Reconstruction Committee" upon the subject of the temporary buildings which are now in the occupation of the War Office, the Ministry of Munitions and other Departments, and some of which may after the war be useful to Local Education Authorities.

2. The Board understand that few Authorities have as yet replied to the circular letter issued to them in May, 1917, over the signature of Major F. Tudsbery, Secretary to the Committee. It appears to the Board to be important that Authorities who are likely to need temporary buildings should make enquiries of the Committee in advance with regard either to particular buildings which may already be standing in their areas, or to any types of building capable of being moved and put up again. This would greatly assist the Department in dealing with the business and would ensure the Local Authority being notified when any particular buildings in which they may be interested are coming up for disposal. It would not involve the Authority in any obligation to purchase.

3. The address of the Committee is: The Secretary, Lands and Buildings Reconstruction Committee, 6, St. James's square, S.W. 1.

4. Drawings of those types of building which appear to the Board to be capable of being used for temporary purposes as Schools of any kind can be seen at the office of the Board's Architect. Diagrams are attached to this Circular.

The materials and method of construction employed in the buildings illustrated in the diagrams, while varying slightly in different types, may be briefly summarised as follows:—

*Foundations.*—Concrete blocks, 18 in. by 18 in. by 18 in., and brick piers 9 in. by 9 in. by 3 courses, on which are laid 4 in. by 4 in. and 4 in. by 3 in. rough fir plates framed together.

*Floors.*—3 in. by 2 in. rough floor joists at 15 in. centres covered with 1 in. ploughed and tongued yellow deal boarding, and 2 in. by 2 in. wrought and bevelled fillets in the angles.

*Walls.*—4 in. by 3 in. rough fir framing and braces, with 3 in. by 3 in., 3 in. by 2 in., and 2 in. by 2 in. intermediate studding; covered on the inside with asbestos fibrous plaster, and on the outside with 22 gauge galvanised corrugated sheet iron.

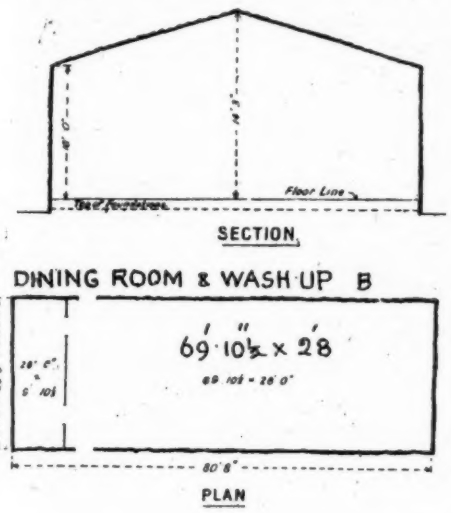
*Partitions.*—Rough studding as above covered on both sides with asbestos fibrous plaster.

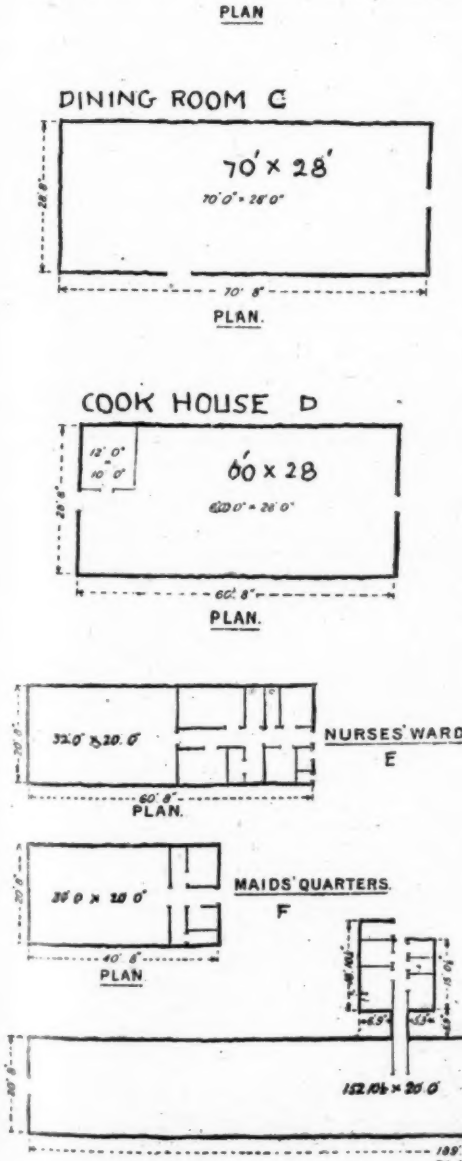
*Roofs.*—Pitched at one-sixth of the span. Trusses, consisting of 6 in. by 2 in. king posts, 6 in. by 3 in. tie beams, 4 in. by 3 in. principals, and 4 in. by 2 in. struts, all wrought, framed, bolted and strapped together, fixed 9 to 10 ft. apart. On the trusses at 2 ft. centres are laid horizontally 3 in. by 2 in. rough purlins to which are nailed 2 in. by 2 in. wrought raking pieces for securing the outside covering of 22 in. gauge galvanised corrugated sheeting. The soffit of the roof is lined with asbestos fibrous slabs.

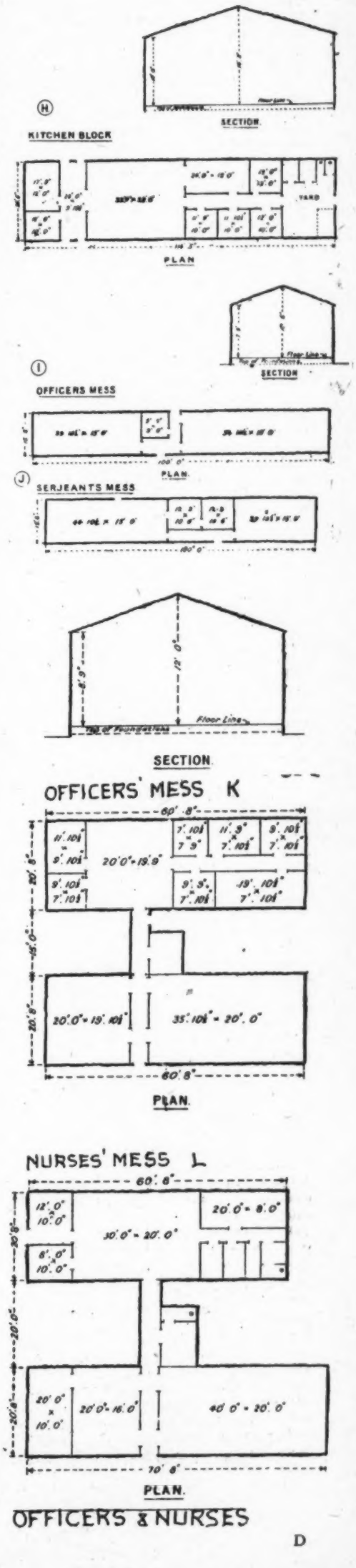
*Windows.*—Wrought, solid frames, heads and sills, rebated for 1¾ in. sashes and 1 in. glazing bars, splayed and rebated. The opening lights fall back inside into metal cheeks to form hoppers, and the greater part of the glazing is 21 oz. sheet glass.

*Doors.*—External doors are wrought, framed, ledged and braced, the panels filled with tongued and V-jointed boarding. Inner doors are wrought square framed and panelled.

*Heating.*—The buildings are heated generally by upright cylindrical slow-combustion stoves, standing on sheet-iron hearths, and having iron flue pipes carried up through the roofs.



## SOME OBSERVATIONS ON HOUSING.

MR. C. H. COOPER, M.Inst.C.E., late Borough Engineer and Surveyor of Wimbledon, recently submitted some notes and diagrams on housing to the Mayor and Corporation.

In the various garden cities, he says, especially those recently erected, the question of sunlight and ventilation has been neglected. Bedrooms are in many cases so placed that direct rays of sunshine can never enter. The benefit to health from sunlight and ventilation is clearly demonstrated in the case of (*a*) open air schools, (*b*) open air treatment of disease and wounds, (*c*) the mobilisation of troops where housed under canvas or in the open as compared with those housed in permanent barracks. In the above cases a comparison can be drawn as regards persons living under similar conditions, except as regards housing. We have many instances in which housing is the governing factor, although only one of a number of factors which exert their influence on the health of the inmates.

In the Carnegie Report for Ireland on the Physical Welfare of Mothers and Children, a striking instance is given, namely, that of child death rate in Dublin,, where 74,000 persons are housed in one-room tenements, the average number per room being over six. Taking the death rate of children under five years of age in Dublin—

| | |
|---|---|
| The professional and independent class, which is lowest, as..... | 1 |
| That amongst the middle class is .. | 3.14 |
| " Artisans and petty Shop-keepers .. | 7 |
| " General Service .. | 14 |
| " Hawkers, Porters & Labourers .. | 17 |

There is little doubt that tenement dwellings, where the sun and air exercise least influence, are largely responsible for the excessive death rate of children amongst the two latter classes, which exceeds by fourteen times that amongst the class which enjoys the greatest amount of sunshine and fresh air.

These cases, says Mr. Cooper, point to a radical defect in dwellings as erected. If it is necessary to provide the maximum sunlight and air in schools and hospitals it is equally necessary that dwellings generally should have the full benefit of these health-giving agencies. Unfortunately, houses are so placed as to intercept the rays of the sun coming to neighbouring buildings. In the ordinary erection of suburban buildings, provision has been made for sunlight and ventilation in the front and rear, but no provision has been made to insure lateral light and air which, in the case of terrace houses, is nil and in the majority of semi-detached buildings is of little effect. A house to be efficiently sun and air flushed must be detached and placed in an open space, say, one-ninth of an acre, with at least 60 ft. frontage.

To secure sun and air flushing, provision should be made that—

(*a*) No building exceeds a certain height.

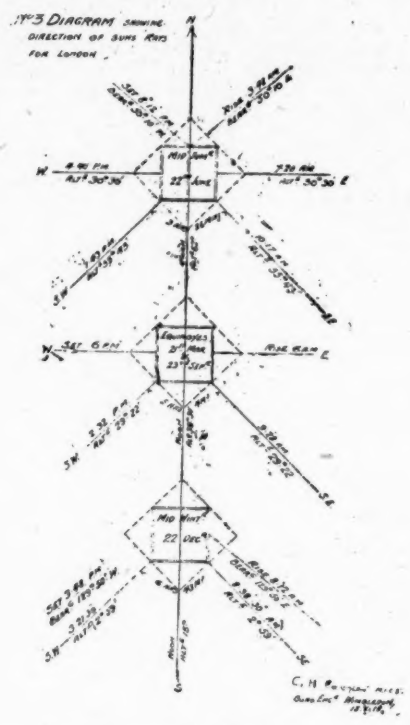
(*b*) That the dwelling be placed only on the portion of the site allotted for that purpose.

(*c*) That no addition be made or buildings erected that would intercept the sun's rays either to the dwelling or to the neighbouring houses.

On such a site, any desired aspect may be chosen for the dwelling irrespective of the aspect of the road. The laying out of roads should be such as provided the desired falls for drainage and the easiest gradients for traction.

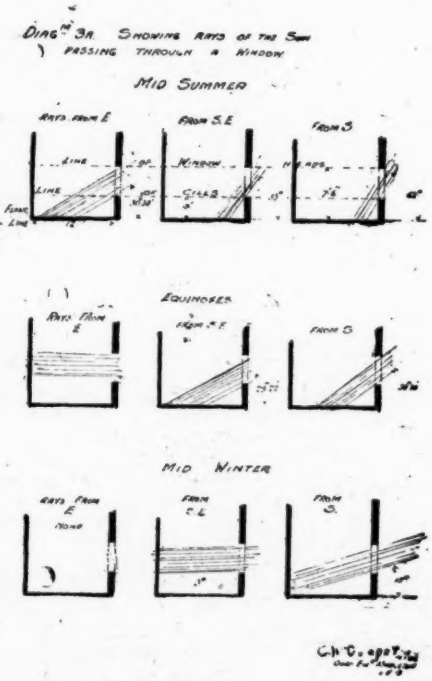
From a diagram prepared by Captain Fulton, R.N.R., the floor area subtended by the sun's rays from any window can be obtained for the London area at mid-winter, mid-summer, or the equinoxes.

Diagram No. 3 shows the direction of sun rays during the periods and in the district named, from which will be seen the necessity of utilising all available rays during the winter when the altitude of the sun is low, the period taken to travel across the southward from S.E. to S.W. being much longer than in the summer. During December and most of January the only effective rays come from the southward. A house facing south gets the benefit of these rays. Where corner windows facing S.E. and S.W. are provided, sun rays are introduced that would otherwise be lost. Walls facing E. and W. appear to offer better facilities for sun flushing in the summer, when the altitude of the sun is too great to allow the rays to extend over the




floors. Diagram No. 3a, shows the effect of the sun's rays at various altitudes in a room 12 ft. deep.

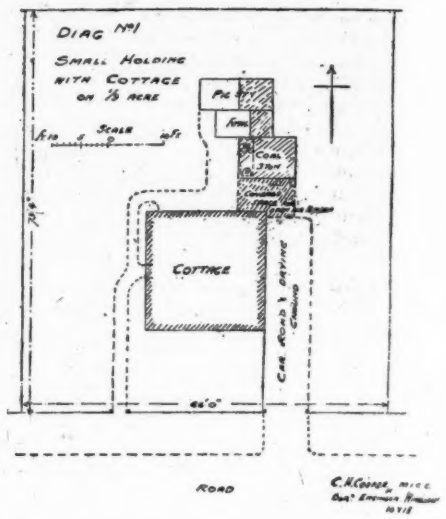
In small, square houses each bedroom can be lighted and ventilated from two external walls so that rooms facing north are sun-flushed from the east or west. If the house is turned so that walls face S.E. and S.W., sun-flushing would appear to be better distributed although the




advantage to rooms facing due south in winter would not be attained.

Diagram No. 1 shows the block plan of a cottage similar to those shown on Diagram No. 4, placed on one-ninth of an acre with outbuildings, &c.

Diagram No. 4 illustrates square, detached cottages. Type (A) shows a cottage 24 ft. square internal dimensions, which provides on the ground floor for a kitchen 15 ft. by 11 ft. 9 in., a separate bathroom 7 ft. by 7 ft., a sitting-room 15 ft. by 12 ft., and a room 12 ft. by 8 ft. 9 in., which may be used either as a sitting-room or bedroom. On the first floor are four




bedrooms varying in size from 117 to 151 ft. super. This cottage cubes out at 14,500 cubic feet, which, at the pre-war rate of 6d. per foot cub., might be taken as costing £360. In Type (B) we have a cottage internally 20 ft. square containing on the ground floor a kitchen 12 ft. by 8 ft. 9 in., a bathroom 7 ft. 6 in. by 5 ft., a sitting-room 20 ft. by 9 ft. 6 in., and three bedrooms on the first floor varying from 85 to 160 ft. super. This cottage cubes out at 9,700 cubic feet at 6d. per cubic foot, and would have cost £245. Type (C) has the same rooms as (B), but smaller and cubes at 7,800 cubic feet, and at 6d. would cost £195. Placed on one-ninth of an acre these cottages leave some thirteen rod of ground for the growing of vegetables; as such ground is close to the home the time lost in going to and from an allotment would be saved. In Diagram No. 1 I show the arrangement that would suit a smallholder keeping fowl and a pig. It would be advisable that movable houses for fowl and pig were used in place of the fixed houses shown, so that they could be shifted from one part of the ground to the other where the crop has been harvested. There is ample provision to store three tons of coal, and I have provided what is essential for a smallholder's premises, namely, an out-of-door fire on which to cook fowl and pig food and burn rubbish; this is placed under a roof between the coal store and house, so that it may be used for cooking food for the house in warm weather, or, in other words, as an open-air kitchen.

It is intended that the bath room should be used as a wash-house and to provide sufficient boiling water for this purpose a separate heater is installed in the kitchen. Should a smallholder desire to kill a pig, the bath will provide the place in which to scald the carcass and over which it can be scraped. By placing a bar edge-ways close to the ceiling of the bath-room the pig can be hoisted for dressing. There is one point that these diagrams should have shown, namely, a casement door in the sitting room in each type. This is essential in order to induce the occupiers to lead as much of an open-air life as possible.

In the plans lately published for the competition that has taken place at the invitation of the Local Government Board and the Royal Institute of British Architects, terrace houses are shown. Again, in the Memorandum issued last year by the Local Government Board, such a method of placing houses is adopted. In none of these recent publications is provision made to effectually harness sunlight and ventilation.

In the following table I have set out the provision made in a terrace cottage, as shown on the Local Government Board's Memorandum (Fig. 12) and Type (C) of Diagram 4.

Both these illustrations have practically the same cubic contents for the purpose of estimating namely, No. 12 Local Government Board 7,600 ft. cub. Type (C) 7,800 ft. cub.

In the case of the detached cottage, there is an increase of 15 per cent. in the external 9 in. wall area, allowance being made for reduction in brickwork due to party walls. This cottage has an increased room floor area of 14.6 per cent. over that of the terrace house; whilst the cottage has the advantage of a separate bathroom and an additional bedroom.

If the question of housing in relation to health is considered on the fundamental principles governing such relation, the building of both terrace and semi-detached houses should cease except in crowded areas.

| — | Detached Cottage. | Terrace Cottage, No. 12 of L.G.B. Memorandum, 1917. |
|---|---|---|
| Cubic contents .. | 7,800 c.ft. | 7,600 c.ft. |
| Floor area total .. | 648 ft.s. | 630 ft.s. |
| Floor area of rooms only .. .. | 566 ft.s. | 494 ft.s. |
| Number of bedrooms | 3 | 2 |
| Living-room .. | 163 ft.s. | 154.9 ft.s. |
| Kitchen .. .. | 70 ft.s. | 85.4 ft.s. |
| Separate bathroom .. | 1 | — |
| Wall area external walls. Party walls taken as half .. | 1,443 ft.s. | 1,260 ft.s. |
| Pre-war estimate at 6d. per foot cube .. | £195 | £190 |




## NOTES FROM THE FOREIGN PRESS.

### REPLACEMENT OF LIGHTNING CONDUCTORS DURING THE WAR.

The German Committee on the construction of lightning conductors has issued new regulations in view of the necessity of replacing most of the existing copper lightning conductors for the purpose of securing the copper for war purposes. In rebuilding, high collecting points with their unnecessary finials may be omitted. Copper may be completely replaced by tinned iron of 100 sq. mm. section, or 50 sq. mm. in branched portions. The existing metal constructions, such as drain pipes, water and gas conductors, may be used. Metal roofs, gutters, &c., should be connected to the system. Earthing is to be made with the water and gas mains. A conductor should be laid along the whole roof ridge with raised conducting portions at gables and chimneys. Existing lead roof ridges may be utilized for this purpose. Copper earth plates that can be removed without too great difficulty should be replaced by connections to water and gas pipes.—*Elektrotechnische Zeitschrift, July* 18.

### THE PROVISION OF DWELLINGS.

An article written by Dwellings-Inspector Jahn, of Leipzig, appears in *Deutsche Techniker-Zeitung*, dated July 6, and the editorial comment is that in view of the new Prussian Dwellings Law, which contemplates the increase of inspection, the views expressed should be of considerable interest. Although the necessity for dwellings is as great as that of food, this has only been recognised by the authorities within the last 30 years. The most unsatisfactory housing conditions occur in the large towns. About 80 per cent. of the population are unable to afford to pay the rental demanded for satisfactory housing accommodation. The author groups under five heads the lack of dwellings:—

1. There is a lack of dwellings, especially those of small size, and therefore overcrowding takes place.
2. The dwellings are not built on sanitary lines, they are damp, flimsy, and dark.
3. Well-built dwellings are so badly maintained by the owners that they become defective.
4. Sound dwellings are used in a way contrary to health and morals.
5. Rents are too high, especially for large families, with the resultant sub-letting and other difficulties. The special duty of the author's department is to look after the dwellings and also the persons who inhabit them; but it should not become a branch of the police service, it must be a branch of Public Welfare. Inspection of residences should be universal and compulsory. It would be unfair if inspection were limited to the dwellings of the poor only; in the case of large houses or business premises special care should be taken to see that servants and assistants are properly housed. The author then gives at great length the chief points of an address on the whole subject delivered by Professor Kraft in 1913.

### FLUORIDE AS A PRESERVATIVE FOR WOOD.

The preservation of wood by antiseptics is a question of growing importance. It is not so easy to treat timber used in building construction as it is in the case of telegraph poles, mine-props, and railway sleepers, but many examples show that it can be done. The important question, then, is, What is the most effective and generally suitable substance possessing antiseptic properties? As a protection against dry rot the fluorides have been found by a now wide experience to be very effective not only for building timber but also for telegraph poles.

Seven years' experience in the Austrian Government Telegraph Department justifies the author of an article in *Chemiker-Zeitung*, August 3, in speaking confidently of the merits of zinc fluorides as a preservative for poles. It compares very favourably with copper sulphate. When a complete impregnation of the wood is not desired, or is impracticable, a partial application of sodium fluoride will be found to have a marked preservative action.

### THE IMPREGNATION OF WOOD WITH TAR-OILS FOR STRUCTURES IN WATER.

*Zentralblatt der Bauverwaltung* (June 15, 1918) states that the German Ministry of Public Works have carried out a long series of experiments upon the results of impregnating wood with tar-oils. There are certain difficulties which have to be overcome, but when the process is properly carried out the results are highly satisfactory. The process requires special boilers and machinery, which cannot be transported to the place where the wood is to be used, and the transport of the treated wood entails loss of time and expense; besides this, time must be allowed for drying after treatment.

The working of the wood after treatment is difficult, as the oil is corrosive and spoils the clothes of the workmen; the surface of the wood becomes tough, and if it has to be cut away the exposed surface must be again treated. Piles which had been suitably treated and then driven in water had, after thirteen years' life, still in their pores the greater part of the oil; these piles were entirely unharmed by the teredo, although untreated piles had been destroyed. The life of all timbers is very largely increased, and the author gives details of the cost of treatment, which clearly prove the economy which is effected. The tensile strength of untreated dry timber is always greater than that of untreated wet timber, and, as the impregnation process drives out the moisture, the tensile strength of the treated wood is greater than that of the untreated timber. The Public Works Department has, therefore, decided in favour of using impregnated wood upon all timber structures built in water.

## Leading Contents.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## ILLUSTRATIONS.

### King Edward the VIIth Memorial Hospital, Sevenoaks.

It was found necessary a year or more before the outbreak of the war to consider means for the rebuilding and extending the Cottage Hospital, Sevenoaks, which for many years has served the needs of a wide district. A prolonged search proved of no avail to produce a site of suitable position and character. The Committee, of whom Earl Stanhope was the chairman, decided to acquire property adjacent to the present hospital, which stands upon an airy position. The plans illustrated show the course which was adopted by converting the existing building into an administration block, with new wards and other extensions. A contract had been entered into with Messrs. Walter Lawrence & Son, just before the outbreak of war, but the works were not proceeded with. The architect is Mr. William A. Pite, F.R.I.B.A., of 116, Jermyn-street.

### Withington Congregational Church.

The Congregational church at Withington, near Manchester, was erected about 1865 and burned down in 1913. After the insurance was settled, Messrs. Bradshaw, Gass & Hope, of Bolton, were appointed architects for the rebuilding.

The church is planned with a wide nave and aisles against the outer walls. The chancel end has choir stalls on each side with the Communion table central in front, the pulpit on one side and the font on the other. Across the end of the chancel the organ is placed so as to obtain the full tone value throughout the church.

The ashlar for the building is to be Runcorn red with a fair proportion of grey flecked stone. Externally the filling will be Macclesfield stone in rough punched random snecked walling, the internal plastering between the ashlar having sanded surface. Bills of quantities have been prepared so as to obtain estimates immediately after the war.

The drawing was in the Royal Academy Exhibition this year.

### The Church at Medak, India.

At Medak, in the Nizam's Dominions, is an important centre of Wesleyan Methodist Mission work and the church illustrated is now in course of erection. It is situated on a large plain and will form a landmark for an extended district. The main avenue leading to the entrance is already formed, and from it the lower terrace is approached by a flight of steps with a fountain on the central plateau. The upper terrace is approached by another short series of steps opposite the main entrance to the church. These are repeated opposite the entrances on the north and south and the terraces raise the base of the church above the surrounding flat lands.

The building is made especially airy and suitable for large gatherings of worshippers in the hot climate, but though there are special features, the general characteristics associated with a Christian church are maintained. The walls are faced with coursed granite with moulded work and tracery of sandstone and the roof of teak covered with pantiles.

Messrs. Bradshaw, Gass & Hope, F.R.I.B.A., of Bolton, are the architects and the coloured working drawing illustrated was in the last Exhibition of the Royal Academy.

## VENTILATION OF INDUSTRIAL PREMISES.

DURING the past four years the building trade has been largely occupied with the erection of industrial buildings and structures necessary for war purposes and it might be supposed that with no large buildings in course of erection the progress of ventilating science had been at a standstill. This would be far from the truth, for the necessity of conserving the health of the workers in order that their efficiency and a high rate of production might be maintained, together with the increasing interest in welfare work, has brought the question of the ventilation of industrial premises into prominence and has led to far-reaching developments.

Committees appointed by the Ministry of Munitions and by private firms have formulated reports and suggestions, and to-day the architect responsible for the design of any class of industrial buildings may easily obtain data relative to his requirements. It must, of course, always be remembered that every building will of necessity raise its own special problem, but notwithstanding that, the mass of information that has been obtained gives the possibility of deduction of certain general facts that will form the basis of and be applicable to any new scheme of ventilation. Whenever a scheme of ventilation is being prepared, the heating scheme of the building must be considered, for the heating and ventilation of buildings are mutually dependent upon each other. Of the two, ventilation is by far the more important, for in many trades the work carried on renders heating unnecessary. This does not mean that on cold days door and windows should be closed, for the natural heat given off by both the workers and the machines is in all cases charged with harmful impurities.

Ventilation has for its object the removal of vitiated air and its replacement by air which has been defined as :—(*a*) Air which is pure and clean for the workers to breathe, and (*b*) an atmosphere that is both stimulating and refreshing. This second requirement has been far too often overlooked, and the fact that chemically pure air may tend to depress and enervate those breathing it has been signally proved. In factories where shifts are worked each shift must begin work in a somewhat vitiated atmosphere and if the intensive production obtained by continuous running of machines with alternate shifts is maintained after the war (as advocated by Lord Leverhulme), up-to-date schemes of ventilation will have to be installed.

Where a building has been left empty for some little time and where the atmosphere is "pure," no sooner has work commenced and machines begun to run than various impurities make their appearance, chief of which are carbonic acid, bacteria and the dust and fumes produced by the work carried out in the shop. The presence of carbonic acid is not the greatest evil that is existent in the industrial building; it is probable that bacteria is the most potent form of impurity that has to be eliminated from the works. The recent epidemic of influenza has witnessed cases where harmful organisms have passed from one department to another until the closing of the factory has been necessary.

It might be argued that if greater cubic air space were given to the workers most of the present troubles would be eliminated, but such requirement would in many cases be impossible. In any factory, space must not be wasted if efficiency and rapid co-ordination of work is to be maintained; but apart from this large masses of stagnant air have been found in many shops where large machines and few workers are employed. The presence of stagnant air has been proved to lead to feelings of depression and fatigue with a consequent lowering of production, and bearing these facts in mind a recent Government publication has characterised the desirable atmosphere as being—

(*a*) Cool rather than hot.
(*b*) Dry rather than damp.
(*c*) Diverse in its temperature in different parts and at different times rather than uniform and monotonous.
(*d*) Moving rather than still.

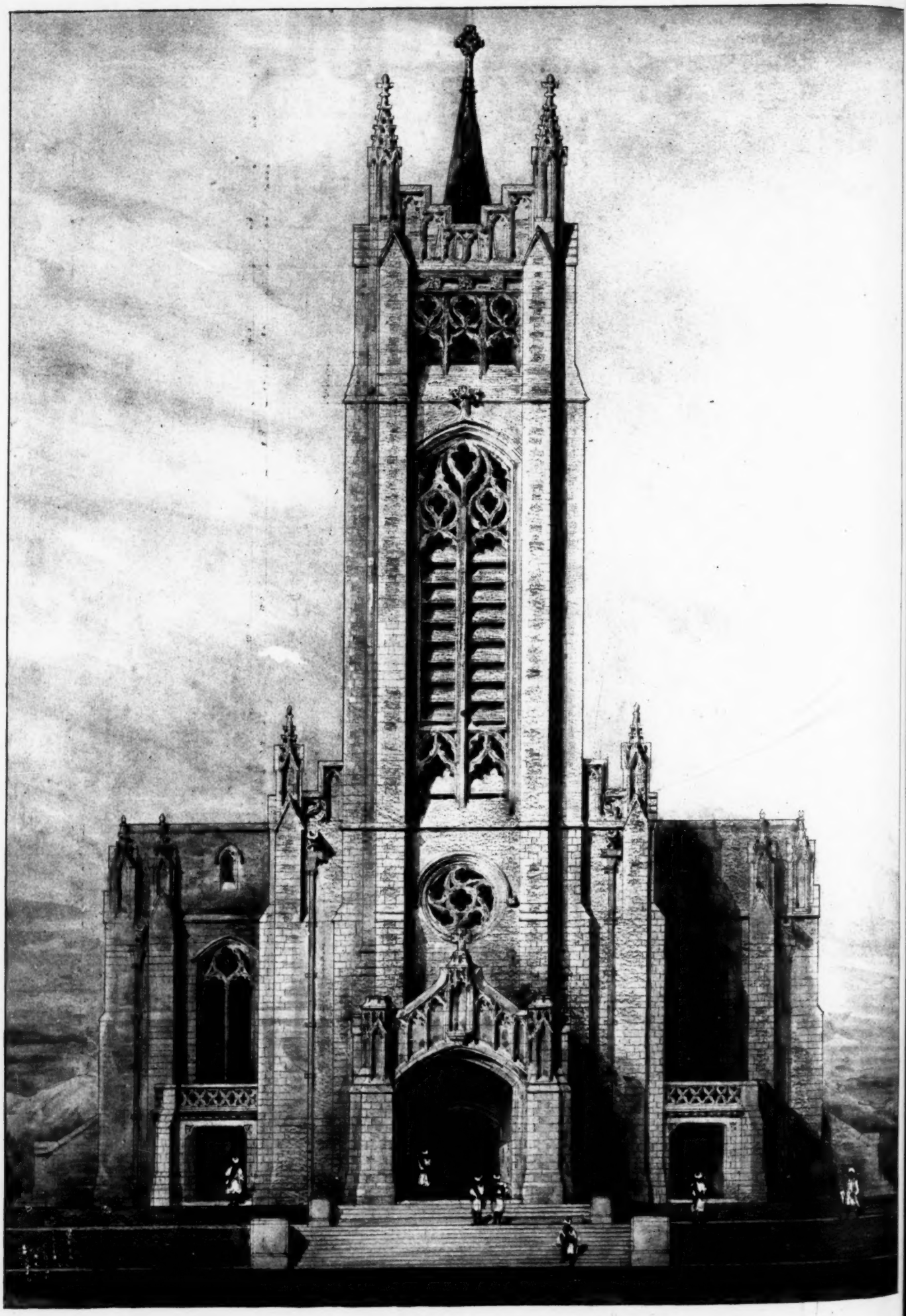
Opinions still greatly differ as to the limits of temperature that should be maintained in factory and industrial buildings, but the following table, which represents an average of the experience of many workers, will be found generally satisfactory :—

| | Degs. Fahr. |
|---|---|
| Heavy manual labour | 44–48 |
| Heavy labour at machines | 48–50 |
| Light labour at machines | 50–54 |
| Very light labour at machines | 58–67 |
| Sedentary work | 58–66 |

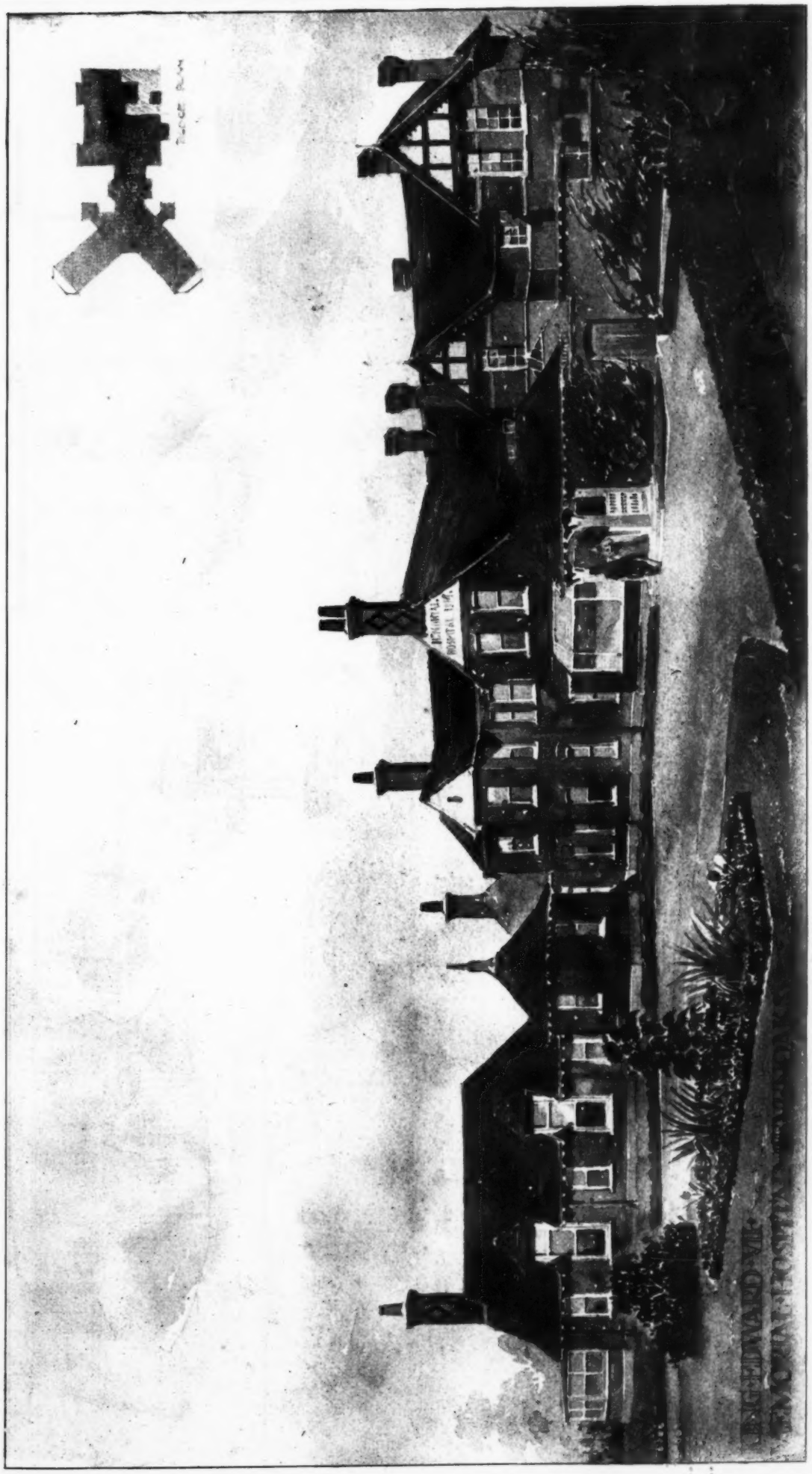
Sometimes the work carried on in the building will control both the temperature and humidity of the atmosphere required, and in such cases methods of control within fixed maximum and minimum limits are placed in the hands of a responsible person. Similar procedure should be the rule in every building, for, if scientific control of the atmosphere is obtained, headaches and many minor ailments will be reduced and general efficiency improved. The number of times that the whole volume of air within the building must be changed depends on the work carried out, but in no case should it be less than four times per hour. This figure may be raised to thirty-five times per hour in the case of an aircraft "dope" room, and experience has proved that a mechanical system offers the only sure method in large works, though in most cases windows should be made to open direct to the external air. The details of the mechanical systems in general use are various, but the use of fans with or without ducts is common to most. The more scientific provide for both forcing fresh air into the building and for withdrawing the vitiated atmosphere, but generally speaking factory systems may be divided into two classes—A, Those in which fresh air is forced into building and allowed to find its way out through provided outlets, and B, those in which the vitiated air is withdrawn, inlets being provided for the admission of fresh air. Of the two, the former guarantees that the atmosphere will be changed the requisite number of times per hour, but to make it successful ducts must be provided to deliver the fresh air at several points in each room, and thus ensure that no possibility of stagnant places occurs. To fix a fan in an outer wall and simply to pump cold air into a room will cause draughts that will lead to colds among the employees, and following the line of least resistance direct currents will flow from inlet to outlet and thus leave the remainder of the room unaffected. To prevent air charged with dust from entering the premises screens should always be fixed over inlets, and should be cleaned at frequent intervals. A perfect system of filtering has still to be produced, as the usual practice of relying upon a spray of water tends to increase the humidity of the atmosphere.

Apart from the general ventilation of the building, means should be taken to remove at their source dust, fumes and impurities caused by the work carried out; and for this a separate exhaust system is most convenient. All machines causing dust should be fitted with hoods placed to intercept both the dust thrown from wheels or work and also to catch the dust that would naturally fall to the floor. These hoods should be connected to a duct along which a powerful air current passes and to prevent the contamination of the atmosphere of the surrounding district the discharge should be deposited in receptacles without the factory. Fumes and vapours produced within the factory are also best dealt with by mechanical means, for the older method of carrying them into flues iso ften rendered ineffective owing to downdraughts or atmospheric conditions in the factory.

Even when perfect systems have been introduced for change of atmosphere and removal of impurities at their source, there are still causes of dust production at work. The continual traffic on the floors and the dust inseparable from the cleanest kind of work tend to make a factory dirty, and the installation of a vacuum system is worthy of consideration by employers who desire their building to be as hygienic as possible for the workers.



WESLEYAN CHURCH, MEDAK, INDIA.—Messrs. Bradshaw, Gass & Hope, Architects.

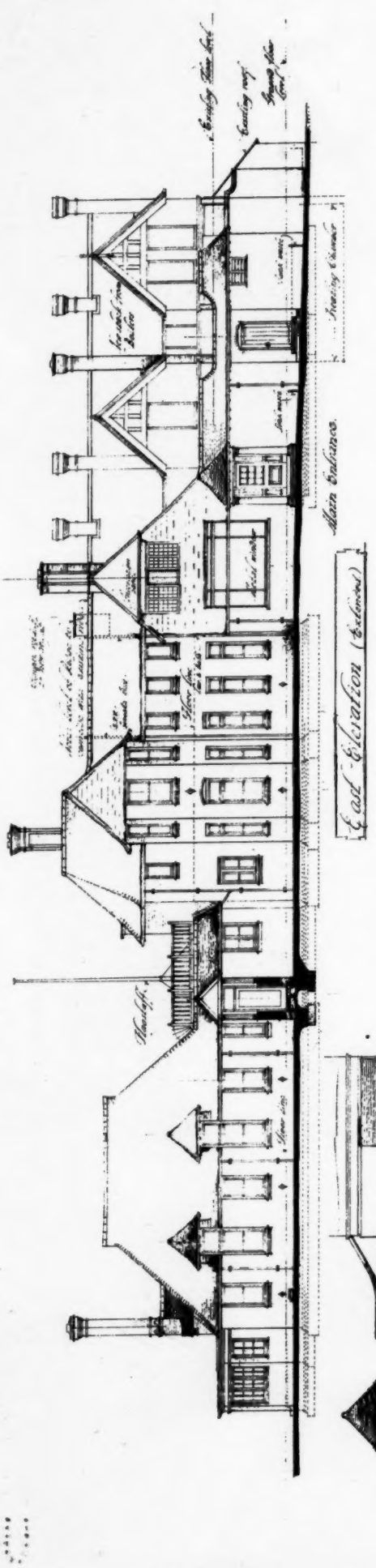


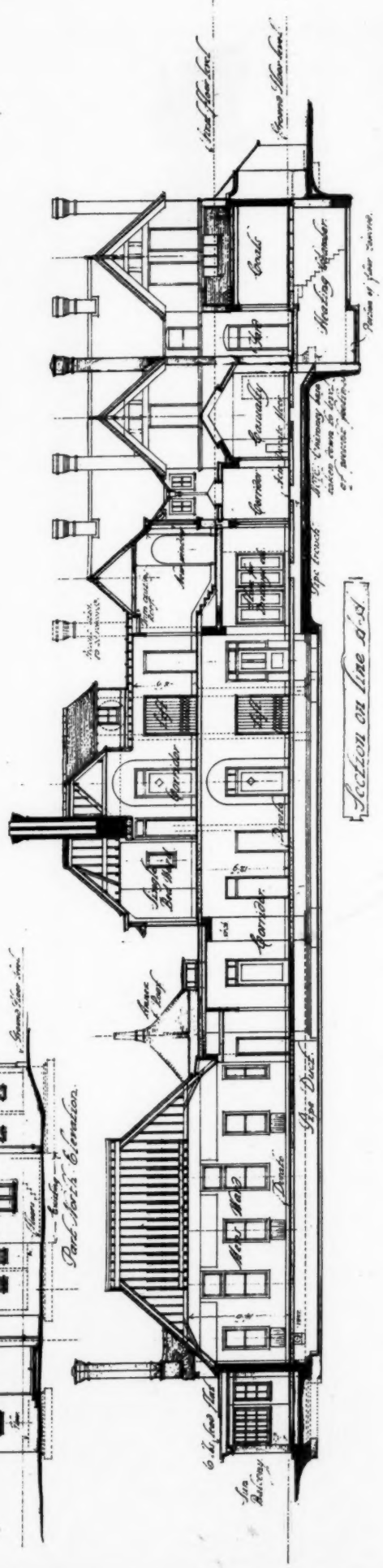
KING EDWARD VII. MEMORIAL HOSPITAL, SEVENOAKS.—MR. W. A. PITE, F.R.I.B.A., ARCHITECT.

# KING EDWARD VII MEMORIAL HOSPITAL

*Sevenoaks, Kent.*

*Scale of 16 feet to an inch.*



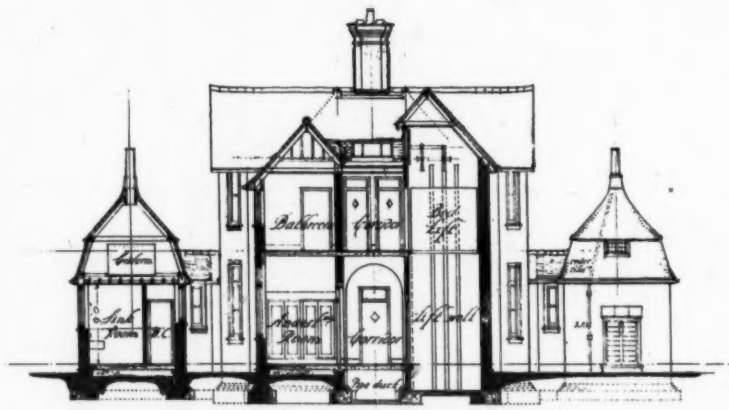




MR. W. A. PITE, F.R.I.B.A., ARCHITECT.

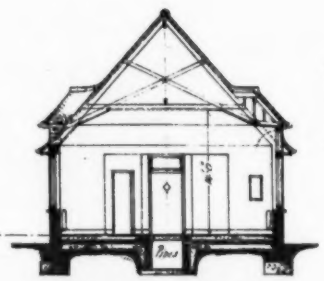
# KING EDWARD VII MEMORIAL HOSPITAL

*Sevenoaks. Kent.*

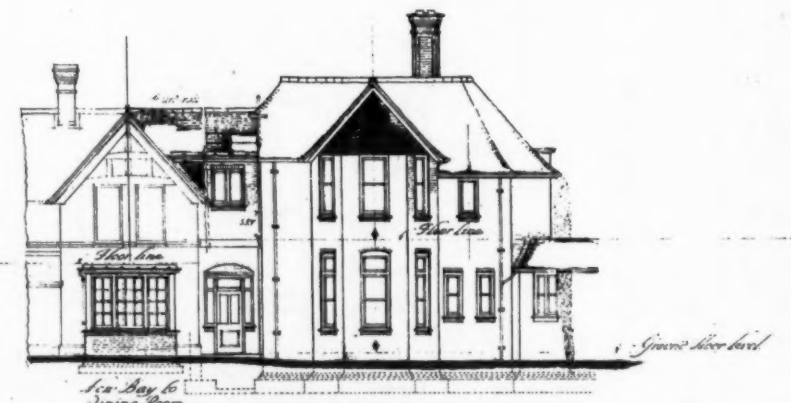
Scale 0 5 0 10 20 30 40 50 of Feet



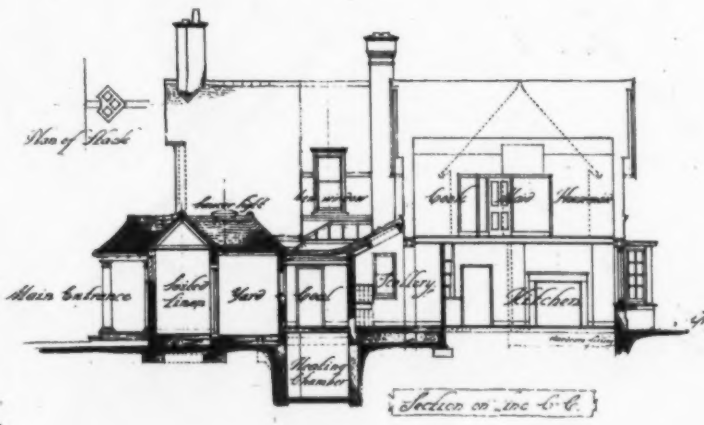

Section on Line B.B.




Cross Section thro' Ward

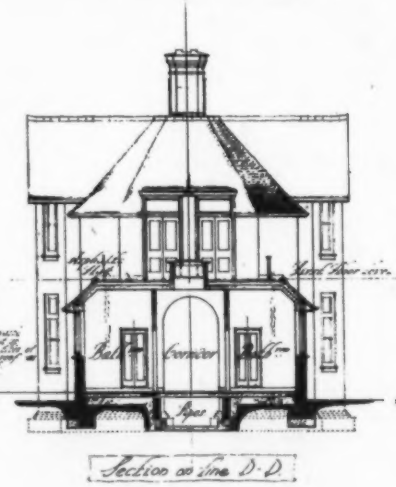



Part West Elevation

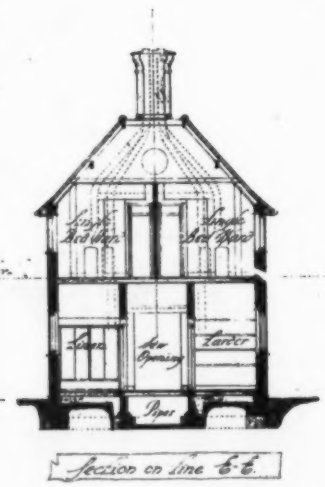



Section on line C.C.

End Elevation of Ward



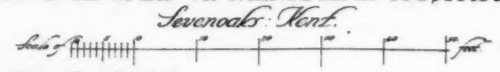

Section on line D.D.




Section on line E.E.

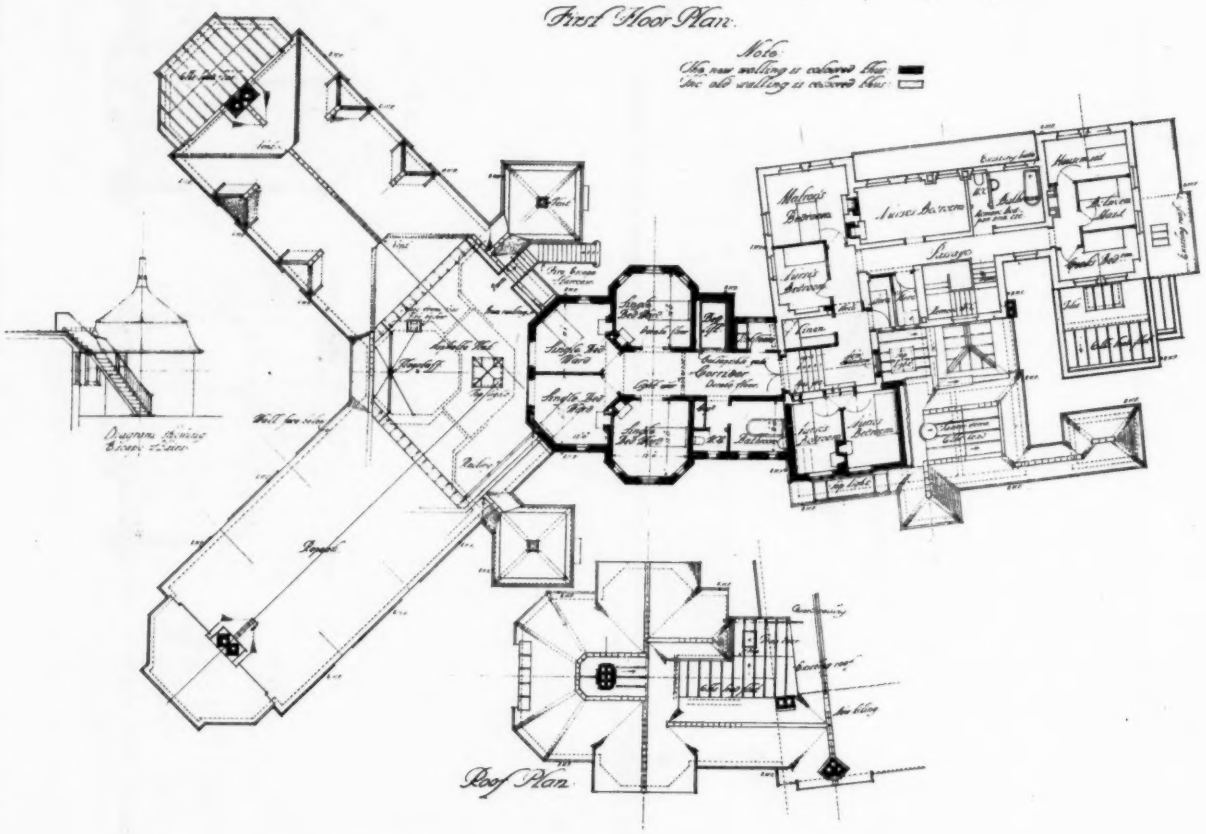
# KING EDWARD VII MEMORIAL HOSPITAL

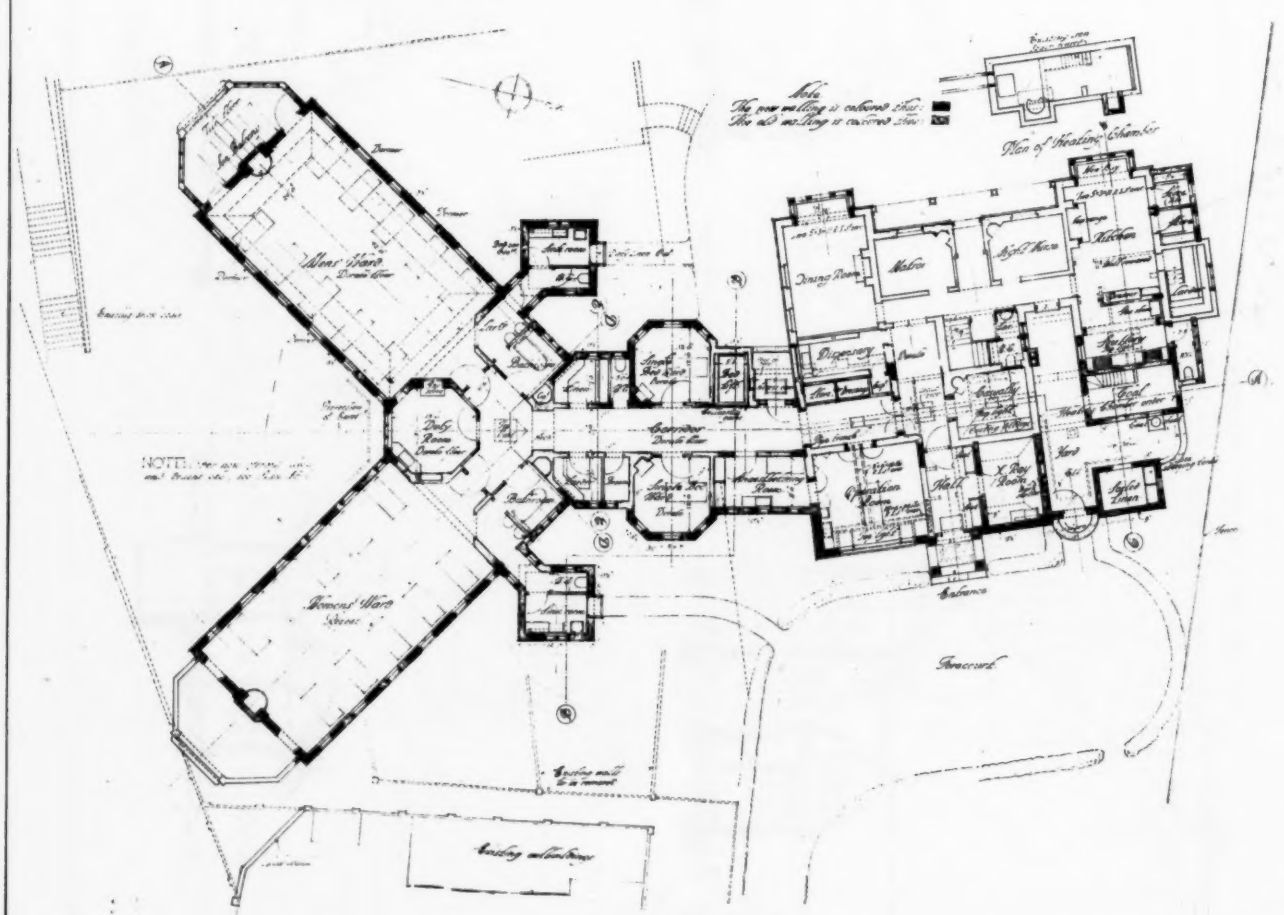
*Sevenoaks Kent.*



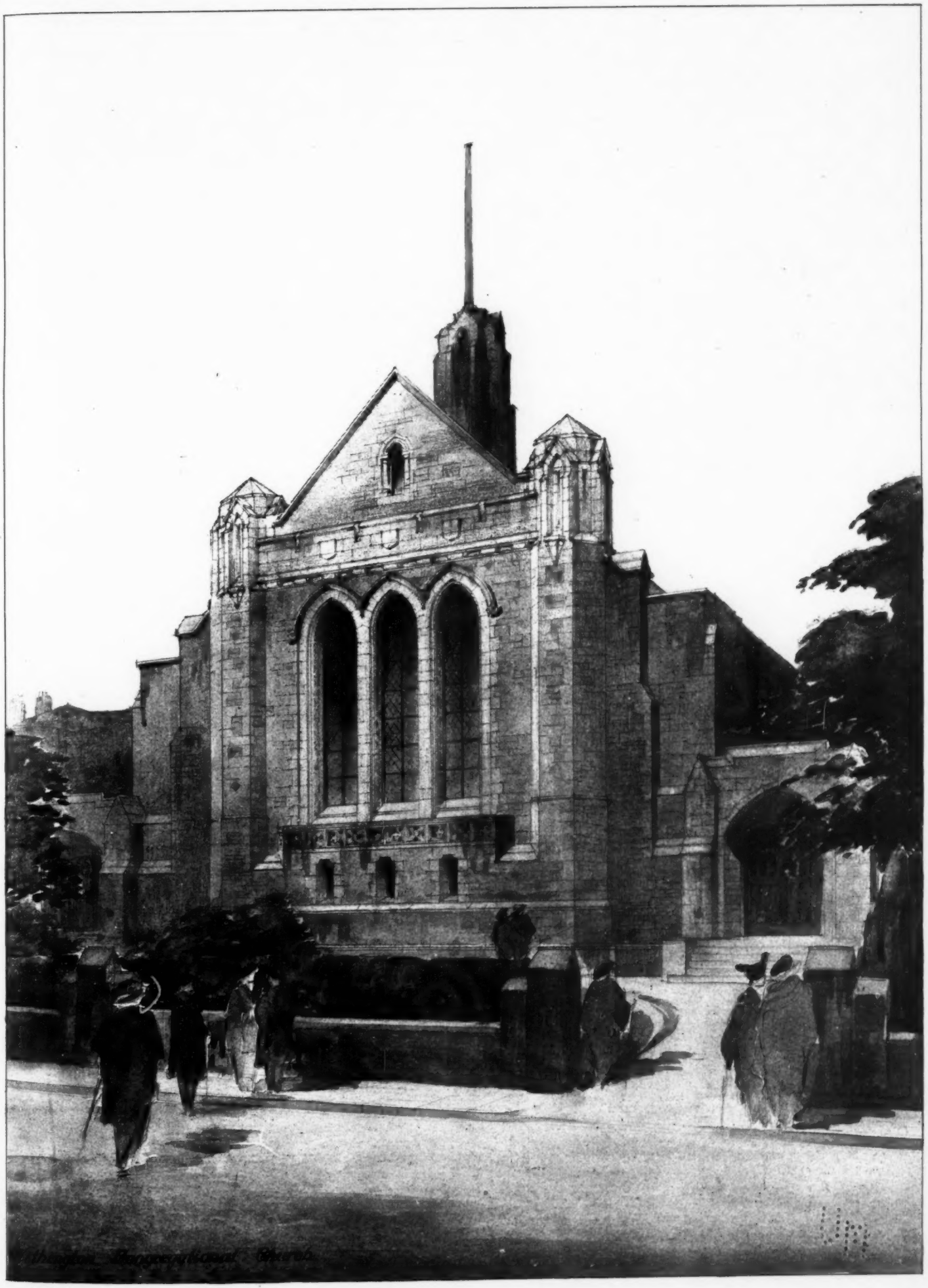
*First Floor Plan.*

*Note.*
*The new walling is coloured thus*
*The old walling is coloured thus*




MR. W. A. PITE, F.R.I.B.A., ARCHITECT.



WITHINGTON CONGREGATIONAL CHURCH.—MESSRS. BRADSHAW, GASS & HOPE, ARCHITECTS.

# LIGHTING, HEATING AND VENTILATION.

## FUEL ECONOMY IN PRIVATE HOUSEHOLDS.

By A. H. BARKER, B.A., B.Sc., Wh.Sc.

*Lecturer in Heating and Ventilating Engineering, University of London.*

In view of the present day shortage of fuel it is important for householders so to regulate their fuel consumption as to use as little fuel as may be, and to utilise the ration to the best advantage. It is, therefore, desirable that the principal scientific facts connected with this matter shall be generally understood in order that the householder may get clear ideas as to the possibility of economy, and in what directions that economy may be secured in practice.

It is impossible that such ideas can be obtained by anyone totally unacquainted with the elementary principles on which the whole matter depends. It is proposed, therefore, in the present article to set these out in as simple language as may be, and to explain how these facts can be best applied.

A person untrained in science may begin by trying to get into his mind the meaning of a *quantity* of heat. He should realise that heat so far as he has to do with it may be regarded as something which is invariable in quantity. That is to say, if one takes a certain quantity of heat, which, to fix ideas, may be thought of as a bucketful of boiling water, that quantity of heat is invariable, and though it may and will escape it will not *diminish* in any conditions with which the householder is likely to have to do. The heat will certainly escape from the water, that is, the water gradually gets cold, but in that case it finds its way into something else, either the air or the furniture or the outside walls or something else.

Just as if one had several pounds of sugar dissolved in water in a bucket, one would have a very sweet solution. If now the contents of the bucket are poured into a large cistern half full of water, the latter would only be made slightly sweet, but nevertheless it is evident there would be as much sugar in the cistern as there formerly was in the bucket. The sugar is not lost; it is only diluted. The sugar could be recovered as sugar if the water were distilled. The case of heat is quite similar.

If, for instance, a bucketful of boiling water is poured into a cistern half full of cold water, the total quantity of heat will not be diminished. The heat will be diluted. The water in the cistern will then be something less than lukewarm, but there is the *same amount* of heat in the cistern as there previously was in the bucket. The heat is not lost, it is only diluted or at a lower temperature.

The difference between the sugar and the heat is this: That if the sugar is left in the bucket the solution will not diminish in sweetness. The sugar will be all retained *as sugar*, but heat though just as real as the sugar has more subtle properties. It will *leak through the substance of the bucket*, which sugar will not do.

If the bucketful of hot water is not poured into another cold vessel, the heat will gradually escape through the metal of the bucket. It will warm the air, and the walls, and perhaps some of the furniture in the room, and the temperature will gradually fall as heat leaks away.

Some of the heat will escape through the walls, and through the window-glass into the outside air, and the temperature in the bucket will gradually decrease. But if we could keep track of all the heat given off from the bucket, which, of course, we cannot do, we should find that the total *quantity* was exactly the same as the original quantity in the bucket.

Now we have to get a mental picture of heat quantity. The total amount of heat in any body may be divided into units. Just as we may divide a mass of sugar into ounces and call every ounce a unit of sugar, so we can divide heat into units, and these units are called British Thermal Units. One may obtain a mental picture of them, thus:

A B.T.U. is just about the amount of heat in an eggcupful of milkwarm water. Exactly speaking, it is the amount of heat which is required to raise one pound of water one degree on the thermometer, or one ounce of water through 16 degs.

We ought to think of fuel as concentrated heat—just as we think of sugar or saccharine as lumps of concentrated sweetness. There is the same quantity of sweetness in every lump of sugar as in every other lump of sugar of the same size and quality.

Just as there is the same quantity of heat latent in every pound of coal as in every other pound of coal of the same quality. Similarly, every cubic foot of the same quality of gas and every unit of electricity irrespective of quality correspond to the same amount of heat.

Both coal and gas vary very much in quality. From a pound of good coal one gets more heat units than from a pound of poor coal. Similarly, from a cubic foot of rich gas one obtains more heat than from a cubic foot of poor gas; but a unit of electricity is always the same. It does not vary in quality. It does, however, vary in pressure or what is called voltage, but that does not affect the quality of the electricity at all.

The electric meter measures out in effect a quantity of electricity which is equal to 3,410 heat units, whatever the voltage may be.

It is true that when electricity passes through a lamp the light varies from time to time according to the voltage, but at the same time, while the light is dim, the electricity is being used at a lower rate. What I wish to emphasize is that one unit of electricity represents the same amount of heat whether its voltage is 5 or 50 or 5,000.

Gas varies in the main both in pressure and in quality. If the quality of the gas is inferior, although a cubic foot of the poor gas does not contain as much heat as a cubic foot of good gas, the gas meter marks up a cubic foot all the same. When, therefore, the gas company lowers the quality of the gas and maintains or increases its charge for 1,000 cubic ft., it is taking from the consumer at both ends. What the consumer assumes that he is buying is a certain amount of heat; the gas company gives him a certain number of cubic feet—a very different thing.

The electric companies, on the other hand, if they lower the voltage, automatically give a greater amount of electricity at the reduced voltage for the same money than they do for the standard or increased voltage. This is in consequence of the different principle of the meter. I do not say the electric companies would not profiteer if they could, just as the coal gas companies do, but the type of meter does not allow them to do so. They can only profiteer by honestly raising their prices, not by lowering their quality.

Table I shows the number of units of heat which can be obtained from a pound of coal of different qualities, and different qualities of gas, and from a unit of electricity.

Now when we buy coal or gas or electricity, we are in effect paying so much money for so many thermal or heat units, that is, so many eggcupsful of milk warm water. The number of units which we get for a penny naturally depends on the price of the fuel and on its quality. Tables II. and III. and IV. give the amount of heat which can be bought for 1d. with various qualities and at different prices.

To understand how this applies to the coal ration, it may be recalled that by the Coal Controller's regulations, one ton of coal may be exchanged for 15,000 cubic ft. of gas, or for 800 units of electricity. Now to convert all these quantities into heat units, the following is the Coal Controller's equivalent:—

1 ton coal = 31,400,000 B.T.U. = 100 %.
15,000 cub. ft. gas = 7,200,000 B.T.U. = 23 %.
800 units electrical = 2,730,000 B.T.U. = 8·7 %

It must be explained, however, that these equivalents were determined by the Controller not in relation to their value to the consumer at all, but in relation to the amount of coal which is destroyed. Of course both gas and electricity are produced directly from coal. We destroy so much coal in a certain way and produce so much gas or so much electricity. The fact is that 15,000 cubic feet of gas produced at the gasworks causes the destruction of approximately one ton of coal. Similarly, 800 units of electricity generated at the generating station when the plant is of good quality causes the destruction of one ton of coal.

Incidentally it may be remarked that the Coal Controller was very generous—in my opinion too generous – in allowing so much as 800 units of electricity for one ton of coal. This figure was based on the idea that at the electric works 2½lbs. of coal has to be burnt to produce one unit of electricity. This figure is only attained in a few of the best plants. In ordinary works the figure is nearer three.

It is important, therefore, for the consumer to understand the relation of these heat quantities as far as he is concerned, so that he may know which is the best way of taking out his ration. We are then faced with the position as follows:—

In order to fix ideas let us assume the present cost of coal at 47s. a ton, assume gas at 4s. a thousand cubic feet, and electricity at eighteenpence a unit. On this basis for a penny we can buy the following quantities of heat in the form of coal, gas, and electricity. Coal, 55,500; gas, 10,000; electricity 426, that is for the same money we get for coal 100, gas 18, electricity 0.77 B.T.U.

It must not be supposed, however, that when we buy, say, 100,000 heat units in coal we get exactly the same *effect* as when we buy *the same quantity of heat* in the form of gas, or of electricity, the reason being that we can use the same amount of heat bought in the form of electricity much less wastefully than we can use heat bought in the form of gas, and the latter much less wastefully than when bought in the form of coal.

Before, however, we can say that heat bought in the form of coal is cheaper than heat bought in the form of gas or of electricity we must make further enquiries as to how economically we can use coal heat, gas heat, and electrical heat. Just as in domestic matters, before we can say that a joint of beef at 1s. 2d per lb. is cheaper than

another joint at 1s. 10d., the housewife enquires how much bone and waste there is in each, so here we have to know how much of the cheaper coal heat we shall have to waste before we can employ the balance usefully.

Now to fix ideas on this question, we have to enquire as to what is called the efficiency of the process of using heat, and by the efficiency is meant what proportion we are able to use of the total amount of heat that we buy. To give a sample illustration of this: Suppose we are boiling a quart kettle of water on a gas ring. Now to boil a quart kettle of water corresponds perhaps, to 450 heat units, that is to say, there are that number of heat units in a quart kettle of boiling water, including the hot kettle itself.

Now since there are, say, 500 heat units in every cubic foot of gas, we might easily calculate that we should need only about one cubic foot of gas to boil a quart kettle of water. So we should if we could transfer all the heat in the gas to our kettle of water, but we cannot. A lot of the heat escapes while we are doing the boiling.

The gas ring is a most extravagant appliance. If we make measurements of how much gas is actually required to boil our kettle, we shall find it is in the neighbourhood of 4 cubic feet, corresponding to 2,000 heat units, so that while we only nominally require 450 heat units to boil the kettle, we have in practice to use 2,000 heat units bought in the form of gas.

Now 450 heat units is about 22½ per cent. of 2,000, so that for every 100 heat units we buy we only transfer 22½ per cent. to the water in the kettle, and this 22½ per cent. is called the "efficiency" of the process. If we were to see what is the efficiency of the process of boiling the same kettle on a coal fire, we should find it is enormously lower than 22½ per cent., that is to say, we should have to find very much more heat units than 2,000 in the form of coal in order to boil our kettle.

With a good electric kettle, on the other hand, we should use very much more than 22½ per cent. of the total heat purchased, the actual figure being approximately 85 per cent., so that in boiling an electric kettle we should have to pay for, say, 530 heat units, while with gas we should have to buy 2,000.

It will thus be seen that in order to find out what the real cost of the heat is to us, we have to multiply the number of heat units we can buy for our penny by the efficiency of the process of using the heat. We shall then obtain the number of useful heat units that we obtain for our penny.

If it were possible to give general figures of efficiency of the various processes of using heat for various purposes we could see at a glance which was the most economical way to perform the various operations for which heat is required in the household, but unfortunately the method of applying the process varies so greatly that no general rule can be formulated.

Take, for instance, the process of boiling a kettle on an open fire. Here we can tell readily enough how much heat there is in our kettleful of boiling water, but it is impossible to tell how much of the total fuel burned in the fire has been expended solely on boiling the kettle. If we start with the fire cold, and have to burn paper and sticks and matches and coal in order to light the fire, then boil our kettle and see how much heat we have used on the whole in order to do it, the total result would be an extremely low efficiency, possibly not more than one or two per cent.

If, on the other hand, we already have a fire which is used for warming the room or other purposes, and if we merely put the kettle on an existing fire, it will be impossible to say how much of the heat which we transfer to the kettle would not have been consumed if we had not put the kettle on the fire. The problem is thus wholly indeterminate.

It might well be that neither the fire nor anything else was affected by the addition of the kettle, in which case we might reckon our efficiency to be almost 100 per cent. We thus see that the efficiency of boiling a kettle on an open fire may vary from 1 per cent. to 100 per cent., that is, throughout the whole range according to the way we reckon the matter.

The same thing is true of using fuel for cooking purposes. It is exceedingly difficult to determine what percentage of the total heat is actually used without very elaborate experiments, which are totally impossible in a private house, and can only be carried out in a scientific laboratory. But the householder does not require his information in such a precise form as this. He wants to know, broadly speaking, what is the relation between the economy due to the use of gas and of coal, or of electricity. That is what the present course of articles endeavours to explain.

The same difficulty in determining efficiencies is found in connection with coal cooking ranges. Ranges differ very greatly. Some appear relatively economical, and some relatively extravagant. In the absolute sense all of them are excessively extravagant compared with what they ought to be.

It has been estimated by the author that not more than two or three per cent. of the heat in the coal is actually used in an ordinary coal range. A very economical range would use four or five per cent., and an extravagant one perhaps two per cent. That means that for every 100 heat units which the consumer buys his range wastes 95 even on a good basis.

HEAT OBTAINED FROM A POUND OF COAL, A CUBIC FOOT OF GAS, AND A UNIT OF ELECTRICITY :—

**TABLE I.**

| | | |
|---|---|---|
| Good coal (B.T.U. per pound) | .. | 15,000 |
| Medium ,, ,, | .. | 14,000 |
| Poor ,, ,, | .. | 13,000 |
| Very poor ,, ,, | .. | 10,000 |
| Good coke ,, ,, | .. | 13,000 |
| Poor ,, ,, | .. | 11,000 |
| Very poor ,, ,, | .. | 8,500 |
| GAS. | | |
| Very good gas (B.T.U. per cubic ft.) | .. | 650 |
| Medium ,, ,, | .. | 550 |
| Poor ,, ,, | .. | 500 |
| Present day gas ,, ,, | .. | 480 |
| ELECTRICITY. | | |
| B.T.U. per unit .. .. .. | .. | 3,410 |

**TABLE II.**

COAL OR COKE: NUMBER OF HEAT UNITS BOUGHT FOR ONE PENNY.

| Price per Ton | | 20/- | 25/- | 30/- | 35/- | 40/- | 45/- | 50/- |
|---|---|---|---|---|---|---|---|---|
| Quality of Fuel. 9.000 | .. .. | 83700 | 66980 | 55800 | 47828 | 41850 | 37200 | 33480 |
| 10.000 | .. .. | 93000 | 74400 | 62000 | 53142 | 46500 | 41333 | 37200 |
| 11.000 | .. .. | 102300 | 81840 | 68200 | 58457 | 51150 | 45466 | 40920 |
| 12.000 | .. .. | 111600 | 89280 | 74400 | 63771 | 55800 | 49600 | 44640 |
| 13.000 | .. .. | 120900 | 96680 | 80600 | 69057 | 60450 | 53711 | 48340 |
| 14.000 | .. .. | 130200 | 104160 | 86800 | 74400 | 65100 | 57866 | 52080 |
| 15.000 | .. .. | 139500 | 111600 | 93000 | 79714 | 69750 | 62000 | 55800 |

**TABLE III.**

GAS: NUMBER OF HEAT UNITS FOR ONE PENNY.

| Cost per 1000 ft. | | 2/- | 2/6 | 3/- | 3/6 | 4/- | 4/6 |
|---|---|---|---|---|---|---|---|
| Heat value of 1 cubic foot. 400 | .. | 16666 | 13333 | 11111 | 9530 | 8340 | 7410 |
| 450 | .. | 18750 | 15000 | 12500 | 10730 | 9380 | 8330 |
| 500 | .. | 20820 | 16680 | 13890 | 11900 | 10420 | 9260 |
| 550 | .. | 22900 | 18340 | 15290 | 13100 | 11450 | 10200 |
| 600 | .. | 25000 | 20000 | 16780 | 14300 | 12500 | 11100 |

**TABLE IV.**

ELECTRICITY: NUMBER OF HEAT UNITS BOUGHT FOR ONE PENNY.

| Price per Unit | ½d. | ¾d. | 1d. | 1½d. | 1½d. | 2d. | 3d. | 4d. | 5d. | 6d. | 7d. | 8d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Heat for 1d. | 6820 | 4544 | 3410 | 2728 | 2283 | 1705 | 1136 | 852 | 682 | 568 | 487 | 426 |

*(To be continued.)*

## ELECTRICITY IN THE COUNTRY HOUSE.

WHEN the Government proposals for a national system of electricity supply are carried out there will be few country houses beyond reach of the public main, and in designing new houses architects will do well to wire them in carcase, not only for lighting, but for cooking and heating. When the national scheme is in operation, it will provide for every class of supply at rates lower than those ruling to-day even in populous districts, and it will be not only convenient but economical to carry out most domestic operations with the aid of electricity.

In the meantime country houses outside an existing area of electric supply, or situated at too great a distance from a public main to justify the cost of a service, must depend upon a self-contained generating set. Many manufacturers specialise in country house lighting plants, which, in the smaller sizes, are designed usually to run on petrol. In normal circumstances such sets will generate electricity at a cost that is by no means excessive, but at the existing charges for motor spirit, the cost is very heavy, even if an adequate supply of fuel can be obtained. With an engine of good design the petrol consumption should not exceed ·7 pint per horse-power hour. It is possible, however, by the use of a suitable carburettor, to run such an engine on ordinary paraffin, petrol being used merely for starting up; but the output on paraffin is about 5 per cent. less with a given size of engine than when petrol alone is employed. Running costs with paraffin are quite reasonable, the consumption for a 7 h.p. engine driving a 5 k.w. dynamo at full load averaging about ½ gallon per hour. With paraffin at 2s. per gallon the cost of fuel for generating a unit of electricity works out at about 2½d., but, of course, the fuel bill is only one item in the "works' costs." An alternative to the paraffin or petrol set is a gas-driven generator, but if a gas supply be available the cost in a country district is likely to be prohibitive, and it does

not pay to produce electricity from gas if the latter costs more than 3s. per 1,000 cubic ft. It is possible, however, to produce gas on the spot, and engines are available in small sizes that will run satisfactorily, with but little attention and at a reasonable cost, on suction or producer gas obtained preferably from anthracite.

Another alternative source of power is steam, but this is advisable only if the installation be of exceptional size, or if steam can be utilised for heating the house or for other purposes on the estate. A steam plant is costly to put down, and necessitates regular and semi-skilled attention, but in fairly large units, say upwards of 50 k.w., it is the most satisfactory, and may furnish the cheapest supply. Water power offers still a further alternative, but it is seldom, in this country, that a stream with ample volume throughout the year can be utilised for a country house supply. Suitable sources of water power do exist, however, and have been tapped successfully. Once the equipment has been installed, running costs are low and the attention required is small, although the initial outlay involved in damming a stream, forming a reservoir to store up water against dry seasons and laying the pipe line to the turbine are items that have to be faced in addition to the cost of the power house and plant.

For the average country house, with its 75 or 100 lights, the petrol or paraffin-driven lighting set is the most practicable and involves the least capital outlay, and in normal times can be run at small expense. If it is desired merely to light the house and not to give a supply for heating or cooking, a 5-h.p. set, in conjunction with a storage battery, would be of ample capacity to supply 100 metal filament lamps taking an average of 40 watts apiece and giving a candle power of about 30. Such a set would be run for an hour or two during the day by the chauffeur or gardener, the lights being supplied from a battery, which would be charged while the engine was running. It is seldom satisfactory to run lamps direct from a small lighting plant, variations in speed and changes in the load affecting the voltage and giving an unsteady light. A supply from a battery of accumulators always is steady, even though the engine may be running at the same time and charging the cells, although with the engine at rest the pressure or voltage gradually will drop as the battery becomes exhausted. Cells of a capacity ample to keep all the lights connected running throughout the longest winter evening should be installed to guard against any appreciable fall in voltage and consequently in the candle power given by the lamps.

Now that electric lamps with filaments of pure drawn tungsten are in general use, a lighting set with a much smaller output may safely be installed than was possible some years ago, when carbon filament lamps only were available taking from three to four times the power for an equivalent light. In small country houses, with 30 or 40 lamps connected, of which not more than two-thirds ever would be switched on at one time, a 2-h.p. set would be of ample capacity, whereas one of 6 to 8-h.p. would be none too large if carbon filament lamps of equivalent candle power had to be supplied. By putting in a battery of greater capacity and running the engine for a longer period to charge it fully, a set with an output even lower than this would suffice.

A somewhat recent and important development in country house lighting plants permits of semi-automatic running, and not only obviates the necessity for much of the attention usually needed, but makes possible the use of a smaller battery than would otherwise be required. In this system the battery will supply a few lamps, but as soon as a greater number is switched on the engine starts up automatically and keeps the battery under charge, stopping again automatically as soon as the extra load is thrown off. Such plants have given complete satisfaction in practice and have been installed in many country houses at home and abroad, being used indeed, not only for lighting supply, but for cooking and heating service.

In order to minimise the cost of cable and to reduce the drop in voltage that takes place where the runs are of great length, and the initial pressure is low, the power plant should be located as near to the house as is practicable, but at a sufficient distance to avoid annoyance through noise or vibration. The battery room should adjoin the engine room, but should be separated from it by a wall to prevent damage from acid fumes, ample ventilation, of course, being provided and materials used in its construction that are proof against the effects of spilled acid or fumes. As to the most suitable voltage to adopt, opinions differ, but a supply at 100 volts offers many advantages. Lower pressures, some as low even as 25 volts, have been employed for country house lighting, but although with such pressures there is no risk in any circumstances of shock or of fire, they involve the use of cables and house wires of considerable size to carry the larger currents needed. Copper is expensive nowadays, and a drop of even a volt or so on a 25 volt system is very noticeable at the lamps. With a 100 volt system, lamps of quite small candle-power, taking only a proportionate amount of energy, can be used. Properly installed, there is practically no risk of fire or of shock, and the wiring can be carried out with conductors of small size at proportionately lower cost. At 100 volts, cooking and heating are practicable, while a dynamo wound to charge a battery of 50 cells that would be required for a 100 volt service would generate at 110 to 120 volts, and could equally well be employed for charging the cells of an electric vehicle. In view of the growing popularity of such cars for short distance runs at comparatively low speeds, the possibilities of using the lighting plant to recharge the car battery should not be overlooked when designing the system.

As to the wiring itself, there are many alternatives from which to choose. If a new house be wired during erection, no better system than ordinary vulcanised indiarubber-covered wires enclosed in screwed steel conduits can be employed, the tubing being run under the plaster and beneath the floor boards. With an old house, this system often can be used with advantage, provided that the work can be carried out before the redecoration is commenced, as chases must be cut in the walls for the conduit. Experienced and careful wiremen will wire even an occupied house on the conduit system with little damage to walls, floor and ceilings, but unless repapering and repainting are to be carried out in any case, some of the runs must be made on the surface, which is neither desirable nor ornamental. There are, however, several surface-wiring systems that lend themselves to installation in occupied houses where no redecoration is to be done. There is the "Stannos" system, for example, which consists of insulated wires with an outer covering of thin metal. These wires are small, are fairly flexible, can be run around mouldings or along picture rails, and even where exposed are not unsightly, owing to their neat form and small diameter. They can be painted to match the surrounding colour scheme, and need no conduit or other protection. Used with a self-contained plant, the outer covering will serve for the return circuit, thus saving cost and reducing the number of wires employed. This system is suitable also for burying in plaster or for running beneath floors and in hollow partitions. The "Prescot" and "Henley" systems offer alternatives, these making use of lead, or lead-alloy-covered wires that also can be run on the surface are flexible and neat in appearance. The metallic covering can be utilised for the return circuit where an independent lighting set is installed or current is taken from a public alternating supply through a double-wound transformer. Another system is the C.T.S., which consists of single wires or multiple cables protected by a covering of tough but flexible rubber compound. This remarkable form of cable can safely be buried in the ground without any protection, can be sunk in plaster, run beneath floors or in hollow partitions, or run on the surface. It is of great mechanical strength, is unaffected by damp or by common acids or alkalis, any likely degree of heat, or by rough treatment, and although somewhat costly, is easy and cheap to instal, and requires no conduit or other form of protection.

Having decided upon the type of plant to instal, the system of wiring to adopt and the voltage at which the supply is to be given, the uses to which the current may be put in a country house call for consideration. The primary purpose, of course, is for lighting, and it is worth while to take considerable trouble so to design the installation that the maximum of convenience can be secured for the least current consumption. Tungsten filament lamps should be used exclusively, but care should be taken to select units in candle powers ample but not excessive for every point. Thus, in a lavatory, on landings, in corridors, storerooms and so forth, lamps of 8 or 10 c.p., taking 10 or 12 watts, will give adequate illumination for a very small power consumption—a 10 watt lamp running for 100 hours before it has used one unit of electricity. By the use of scientifically designed reflectors, the light in the required direction can be increased many times. In living rooms, larger units are needed, but it is preferable to use several lamps of moderate candle-power in a room rather than a single unit giving an intense light. If the new so-called half-watt lamps be used in any of the rooms, their intense intrinsic brilliance must be toned down by the use of suitable globes or bowl reflectors. Very pleasing and restful lighting can be secured by adopting the indirect or semi-indirect system in drawing-rooms, bedrooms, and so forth. If direct lighting is preferred, the greatest efficiency is secured by the use of prismatic glass reflectors, much of the light being wasted if the usual fancy glass shades are employed. Metal filament lamps of the ordinary pattern give out their maximum light in a horizontal direction and a suitable reflector will throw this light downwards, increasing the useful light to such an extent that units of quite small candle power can be made use of successfully. Switch control offers great possibilities and advantage should be taken of some, at least, of the ingenious types of switches that are on the market. Two-way switches ought always to be fitted at the foot and head of staircases, at both ends of corridors, at both doors in a room that can be entered from two different points, and in the bedrooms at the doors and behind the beds. In this way, independent control at two places is provided for, while economy results from the ease with which lamps can be switched out at either point. With a room having three or more doors, two-way and intermediate switches should be used so as to give independent control of the lamps from as many points as may be desired. Special switches are made to provide for selective lighting, so that any one of several lamps may be switched on, but not more than one at a time; or so that one position of the switch will turn on a lamp of high candle power, another position will light up a smaller lamp, and a third position will extinguish either. Other switches provide for master control, so that local switches may be rendered inoperative, or the lights in part or the whole of the house turned on irrespective of the position of the local switches. Others again allow of remote control from one point or from several of lights outside the building, along the drive or in the garage. Switches may be of the ordinary surface pattern, with plain or fluted, flat or domed covers; or they may be sunk flush with the wall and covered by a plate—a variety of finishes being available to harmonise with the surrounding decorations. Wall sockets to supply portable lights or to feed electric heaters, kettles, suction cleaners, fans, and so forth also can be mounted on the surface or recessed; but in every case they should be controlled by an independent switch fixed close by. The plug tops for use with these sockets should be of the "Handshield" type, to avoid damage to the flexible cord when entering or withdrawing the plug and to protect the hand from risk of shock.

[Some further notes on the subject will appear in our next issue.]

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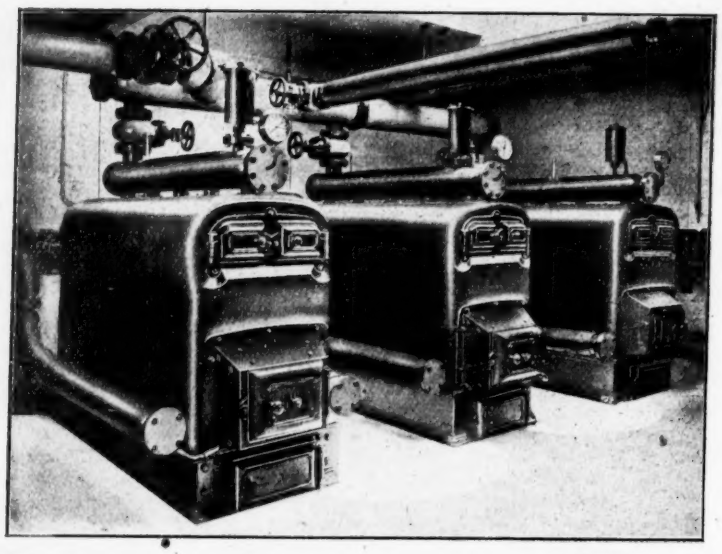

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**SAVING of FUEL and service is very important this winter.**

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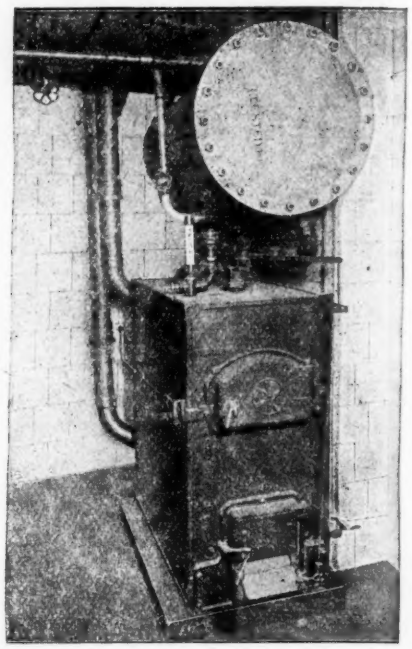

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## "Bailey's" Patent "Non-Pressure" Hot Water Supply

"It must seem somewhat peculiar to those who make no study of atmospheric pressure that an upstairs tank can be served by the usual circulating-pipes from a washing copper having an open top."
—*Plumber and Heating Engineer.*

**Burns Cheap Fuel**

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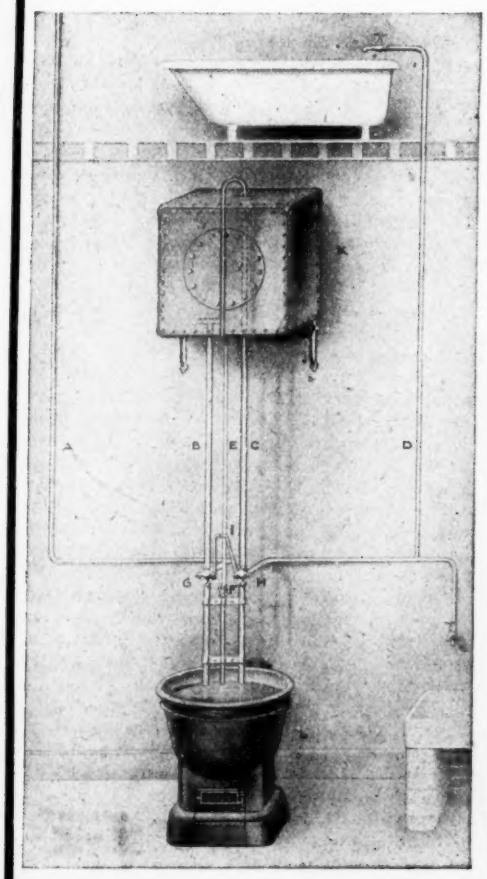


## Utilises the Copper to give supply to Upstairs Bath

"The Copper is filled by opening stop-cock F and the water heated in the copper. A quarter turn of the handle closes A and D and opens B and C, and the water circulates through B and C. When the handle is replaced hot water can be drawn up. We believe the patent should prove a very useful one."—*Builder.*

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# GAS HEATING AND VENTILATING.

THE commencement of the fifth winter of the world war finds the fuel question taking a prominence that it has never received before. The Household Fuel and Lighting Order, 1918, is responsible for this sudden interest, and it is quite a common occurrence in these days to hear the "Man in the Street" discussing the fuel problem with an intelligent understanding which only necessity has quickened.

### The Use of Gas Recommended.

In view of the necessity for conserving our fuel, it will be realised that the use of gas-heating appliances is still recommended—indeed, their installation is still taking place on a fairly large scale. An extract from the *Times* of September 10, supports this contention in the following words :—

> The Coal Controller is being asked by consumers in all parts of the country whether it is more useful in the national interests to save coal or gas. His reply is that every pound of coal and every foot of gas possible should be saved, but when filling up the requisition forms a householder should bear in mind that the national interests will best be served by saving coal before gas. Where a householder had used a gas fire he should continue to do so in preference to a coal fire, but the fire should not be kept alight a minute longer than is absolutely necessary.

Thinking people usually require something more than being told to do this or that, and want to know for themselves the why and the wherefore. If we examine the following figures, the reason for the foregoing statement will be readily understood :—

One ton of coal, when carbonised, produces an average of, say, 12,000 cubic feet of gas (much higher results being obtained on some up-to-date works) with a calorific value of 500 British thermal units per cubic foot, but the coal is not entirely destroyed, as there is a residuum of half a ton of coke, which is practically equal to its weight in coal as a fuel—in addition to such valuable by-products as high explosives, fuel oils, artificial manures, dyes, &c.

Though the imminent necessity of conserving our fuel is undoubtedly of extreme—or shall we say, vital—importance to everyone, the apparatus connected with the *consumption* of fuel is of special interest to our readers.

In carrying out heating and ventilating installations, it is possible, while actually arranging for the *consumption* of fuel, to materially assist in assuring its economic use (which means conservation), if proper care is taken to ensure that each installation is the one most suited to the circumstances and requirements, and that the work is carried out in such a manner as to guarantee that the apparatus will provide its highest possible efficiency.

At the moment, the greater part of the heating and ventilating work that is being carried out is naturally in connection with something of national importance ; the following are descriptions of three such installations which have lately been carried out, in each of which gas is the heating agent :—

### Heating and Ventilating Hut Wards for Wounded Soldiers.

This installation is in one of our large general hospitals. The necessity for additional beds occasioned by the war led the hospital authorities to construct several temporary hut wards ; some of them to accommodate thirty beds, others sixty-six, and some as many as eighty beds.

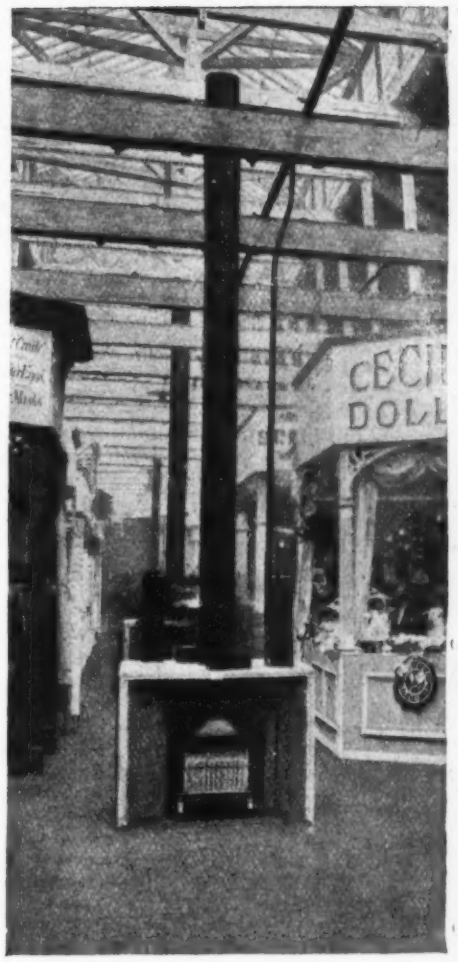
This type of building naturally offers some difficulties, because the heat losses are high and the floor space is utilised to the fullest possible extent, leaving very little room available for stoves or radiators. The illustration is from a photograph of an eighty-bed ward, heated by eight twelve-loop gas steam radiators, fixed in two batteries of four, one at each end of the ward, and sixteen six-loop gas steam radiators, eight of them fixed on each of the exterior walls between the beds ; a total of twenty-four radiators.

The products of combustion from each radiator are collected and discharged through a 2½ in. flue to the open air. Each flue is carried up on the inside face of the hut to 10 ft. above the floor level, and passes through the side wall 6 in. below the guttering. It is then extended upwards for another 2 ft., ending with an Archimidean cowl, and is secured with clips throughout its length, keeping it 3 in. clear of any woodwork. The gas steam radiators are therefore acting in the dual capacity of heaters and ventilators, as the products of combustion passing upwards through the flues and the action of the cowls cause a distinct ventilating effect.

### Heating the British Industries Fair.

The work at the British Industries Fair was carried out for the Board of Trade. The Exhibition was housed in a block of warehouses, forming a part of the London Docks. The building was under one roof of seven spans, the south frontage being on the river, and as it had originally been intended and used for storing wool and hides, every care had been taken to make it as nearly approaching a refrigerator as possible. The area to be heated amounted to 2,000,000 cubic feet, and the temperature to be attained was 58 deg. Fahr.

It was decided to instal a system of open gas fires, and 214 of these were fixed, each



**Heating stoves at the British Industries Fair.**

having a fire opening 17 in. in width. They were arranged in groups, some of two stoves and some of four. The illustration shows one side of a group of four. As the precautions against fire were very stringent, the stoves were fitted in reinforced concrete cells, the base, sides and roof of which were constructed to key together. The structures thus formed had the appearance of fireplaces, and in order to carry this feature a little further, their sides and hearths were painted with terra cotta water paint, and a stencil was cut to line them out in black, to represent 6 in. tiling. The stoves were set 9 in. back in the structures and wire was stretched over the openings, making it impossible for the visitors to scorch their clothing, or to interfere with the heating by either intentionally or

**A ward of eighty beds heated by eight twelve-loop gas steam radiators.**

inadvertently turning the stove taps on or off, a source of amusement which is apt to appeal to some exhibition visitors.

The products of combustion from the stoves were collected in specially constructed boxes inside the structures, and flue-pipes were carried from them to a height of 15 ft., in order to discharge well above the breathing level, and to assist in ventilating the building.

All the principal gas stove manufacturers were represented in the installation, each of them supplying a number of the stoves, the combined effect affording a very good illustration of the excellent results obtainable from modern gas fires.

### Heating and Ventilating a Tea Factory.

This installation is divided into two separate and distinct systems. The ground floor, being used as a counting house, tasting room, &c., required heating only. The first and second floors, comprising the factory proper and the packing rooms, come under the Factory Act, and therefore ventilation had to be combined with heating. The ground floor was already heated by an existing plant, consisting of six twelve-loop hot-water radiators, heated by a solid fuel sectional boiler in the basement, but, as one of the boiler sections had given out, it was decided to use gas heating instead.

The old installation included a 3 in. cast pipe, which made a complete circuit of the basement, being clipped under the girders supporting the ground floor, and the radiators were teed off from this in the usual manner. The fuel required to make good the heat losses by radiation from the 3 in. pipe was considerable, so to reduce the gas consumption to a minimum, the radiators were cut off from this wasteful circuit, and three of them were heated from a gas-heated circulating boiler fixed at the south end of the basement, while the remaining three were connected to another gas-heated circulating boiler at the north end. The water supply was furnished from two small self-filling tanks fixed on the first floor, with an expansion carried up to discharge over each, the overflow pipes being connected to a convenient waste. The subdivision of the installation cut down the run of the circulation to one-third of its original length, and there was also a reduction in the size of the pipes, thus materially minimising the heat losses, and providing a system under very complete control.

The first and second floors had never been heated before and it was decided to instal gas steam radiators throughout. In order to assist in ventilating the premises, each radiator was to be of the type which have a flue outlet. To deal with the situation, a 6 in. trunk flue was run on each floor from one end to the other, discharging into a brick flue. Each radiator had a 2½ in. flue outlet, and flues were run from these and connected into the side—not the bottom—of the trunk flue.

Care was needed in fixing the trunk flues, as the condensation on such a long run (50 ft.) is quite considerable, and precautions had to be taken to protect the flue from the action of the moisture from the products of combustion on the iron. To deal with condensation, each trunk flue was given a total rise of 12 in. throughout its length, and at the lowest end a collecting box was fitted to catch the moisture, which was then run off through a lead pipe into a sink waste.

To protect the flues from the action of the moisture on the metal, each length was dipped in a solution of potash and then thoroughly painted—well brushed in, inside and out—with red lead and boiled oil, made up to the consistency of stiff paint. If this paint is unobtainable, a very good substitute for such work will be found in Torbay Stopping (1 part) and Cream Oxide (2 parts) applied in the same manner as the red lead and oil.

### Gas Heating in Housing Schemes.

The three installations above mentioned are illustrative of many such that have been carried out recently, but in addition to large installations a number of gas heating stoves have been fitted in private houses, flats, offices, shops, &c.

It seems quite possible that gas heating may play a large part in the housing schemes which are to be carried out after the war. In one such scheme, already being carried out by a Government department for housing aircraft workers, we understand that while gas fires are not actually being installed at once, the pipes are being run to some of the fire-places in each house or flat, ready for them if necessary. When it is considered that these residences are being erected for families of the artizan class, one realizes the strides that the use of gas for heating has made in the last decade.

### The Gas Fire in the Coal Grate.

There still seems to be a demand for the type of gas fire which is fitted in coal grates of the bar or barless type, in order to meet the requirements of those who like the gas fire to resemble a coal fire as much as possible; and we hear that in some houses that have recently been turned into flats for officers' families, one or two of this type of fire were fitted in each flat, ready for the occupants when entering the premises.

## THE FUEL AND LIGHTING ORDER AND GRATES AND RANGES.

THE importance of coal to the world at large and to this country in particular can never have been realised as it is to-day, and the existence of a Coal Control Department and the promulgation of the Fuel and Lighting Order will have convinced the British public of the necessity for the most economical use of our supplies. We are so accustomed to the use of coal for heating that it is difficult to realise that the general use in London of what is, with bread, our staff of life, began towards the close of the thirteenth century. At first, however, it was used only by smiths and kindred craftsmen, and was not looked upon with favour. It was believed to be injurious to health, and a public complaint on that score led to a royal proclamation prohibiting its use. But wood was dear, the proclamation became a dead letter, and before long coal was in general use by London householders.

This general use has involved enormous waste in the past, which appears at last to be commonly known, as three thousand letters have been received by the Coal Control Department containing ideas and suggestions for converting the wasteful household grate into an economical heating instrument. The proposals have been carefully sifted and 400 of them are engaging the attention of the Departmental Committee appointed to decide as to the best means of advising the public how to adapt kitchen and household grates so as to reduce coal consumption.

Generally the proposals follow three main lines:—(1) Reduction of grate area; (2) reduction of inlet between hearth and grate bottom; and (3) reduction of fuel outlet to stop roaring fires and the waste of heat up the chimney.

Experiments undertaken by the Coal Control Department with old-fashioned grates show how, by the proper use of the register, coal can be saved and the temperature of the room raised. A fire was kept burning for 6 hours 20 minutes, and tests were made with the register open and partly open. The following results were obtained:—

| | Coal Consumption. | Temperature of room. |
|---|---|---|
| 1. Register fully open | 26 lb. | .. 63 degrees |
| 2. Register a quarter open .. .. | 18 lb. | .. 65 degrees |

With a saving of 30 per cent. of coal the room was actually kept warmer, because the heat was radiated into the room instead of being allowed to pass up the chimney.

Coke and coal tests were then made in a room of 3,760 cubic feet, again with an old-fashioned grate, the register being kept one-quarter open. The fire was kept burning for 6 hours 20 minutes. When coal only was used the consumption was 17 lb. In the same grate coal was then used for starting the fire, and when it was properly alight coke was substituted. The result was that only 3 lb. of coal and 12 lb. of coke were used, and although the consumption of fuel was reduced the temperature rose. In the first case it was 60 deg., in the second 62 deg.

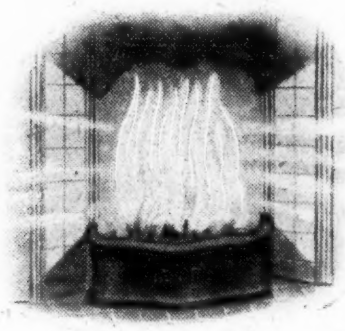
The necessity for economy in the use of our supplies being admitted, the question naturally arises: What is being done by grate manufacturers to deal with the position? Believing that a useful purpose would be served by a direct inquiry on the subject, we wrote to several well-known firms and elicited the following information:—

The CARRON COMPANY (Falkirk and Sheffield) write:—"We, as manufacturers, fully appreciate the necessity, in these times of 'rationing,' of giving very serious attention to construction leading to economy in fuel, and at the same time maintaining the maximum amount of heat for cooking and heating purposes. Quite a large number of our existing patterns of grate designs for domestic heating conform to the requirements in the above direction. Such grates are barless, and have either solid bottoms of firebrick, or firebrick with a minimum of iron grating, and the air supplied through the fret is under full control. The area of the fuel box, when desired, can readily be reduced in the usual way with fire-brick cheeks, although we may say in passing that the larger fire box is very necessary and useful when it is intended to substitute wood or peat for coal. We are not unmindful of the necessity of regulating the waste heat up the chimney. With a green fire, the full chimney opening is required, but by means of a damper fitted to a movable canopy the flue can be almost entirely closed as the fire becomes incandescent. These movable canopies, we find, in an all-round trade such as ours, form a very large and important section, but we notice that architects, in recent years, have not encouraged the design of grates of this type. Ranges, on the other hand, are more difficult to deal with, and we have in mind the lectures recently published in your Journal by Professor Barker, when the necessity was emphasised for economical handling on the part of the person using the range for cooking purposes so as to prevent waste, and the housewife or cook, the manufacturers hope, will, in the near future, lend themselves sympathetically to the instructions that are issued, so as to assist in the very much desired direction of economy. The ranges which we at present have on the market are as up-to-date as experience and continuous experiment can make them, but in latter years the number of services asked of ranges in moderate-sized houses, and the demand for an under-draught type of oven, do not lend themselves to a very great reduction of fuel-box area, though temporary cheeks should certainly be tried. All the flues on our ranges are, of course, easily controlled by means of dampers by the person in charge, and here, again, the user must give some attention to the handling of these to obtain economy. We are at the moment testing a new form of grate for cooking purposes, which seems to us to promise a decided step forward."

MESSRS. R. RUSSELL & SONS, LTD. (Peel Foundry, Derby), write as follows:—"For a kitchen range we consider the modern lifting fire is small enough for all practical purposes, and we do not think it could be reduced further without interfering with the efficient working of the range. A great saving in fuel is effected with a kitchen range of the open and close fire type, by always making it into an open fire when cooking operations are over by pushing back the fire top and opening out the bonnet wings. The principal difficulty we find with

cooks is that they will not be at the trouble to do this, so that the range is continually closed up and the inside of the fire is like a furnace, and consequently there is a considerable waste of fuel, and, in addition, the range parts burn out much more quickly. In regard to the fire space of a dining or drawing room stove, this can be reduced by means of contraction cheeks. Some years ago we carried out extensive experiments to ascertain what air actually went through the grate from underneath. Our conclusion was that very little, if any, went in that way. The fire fed itself from the atmosphere through the front. We consider that the amount of air passing underneath the fire grate is a negligible quantity. In a kitchen range, if the dampers are properly constructed, the draught should be effectually checked by means of these, and this would, of course, prevent the fire roaring. If our suggestion *re* making the range into an open fire when possible, is carried out, this should give a slow draught. In the modern dining or drawing room grates which we make, these are supplied with a valve at the back of the canopy, so that the draught can be regulated to anything desired, from being entirely shut off to a wide opening."

MESSRS. YOUNG & MARTEN, LTD. (Caledonian Works, Stratford), inform us that the points covered by the Controller's recommendations are exactly what were anticipated by them when they brought out the "Hue" fire some eight years ago. This fire is well known and has been favourably referred to in our columns on previous occasions. The design of the "Hue" was the result of long experience and careful study. The sides of the fire basket slope and are fluted, causing the fuel automatically to adjust itself, thus obviating the necessity of attention. When once banked up the fuel in a short time becomes a glowing mass. At the same time the consumption of fuel is slow and continuous, and can be governed by the front regulator. No poking to raise the heat is necessary, thus the creation of dust is obviated. The "Hue," we are informed, "has been placed before the public as an easy, inexpensive and efficient method of converting the old-fashioned coal-wasting type of grate into a modern barless stove, possessing all the advantages of the very latest improvements in open grates without the necessity of pulling down mantel-pieces and removing existing stoves.

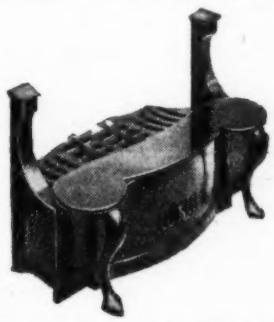


THE "HUE" FIRE.

In instances where existing grates possess very shallow fires, *i.e.*, under 7 in. from back to front, or where the firebricks or sides are burnt away, we very strongly recommend that our special brick backs for deflecting the heat be used. The iron backs in the majority of instances can be removed easily, and the new bricks inserted in a few hours, without taking out the existing stove or touching the mantel-piece and surroundings."

MESSRS. O'BRIEN, THOMAS & Co. (17 and 18, Upper Thames-street, E.C.) are constantly improving their kitcheners to guard against waste of fuel. The minimum consumption of fuel, they contend, can be reckoned on if the flues are properly constructed when fixing the range. They should not exceed 9 in. by 4 in. A careful and intelligent manipulation of the flues by the user will invariably effect an appreciable saving in the consumption of fuel. Their "Eagle" rising fire is a decided economy, as when the cooking is over the grate area can be considerably reduced. Fire bricks may be used when the grate space is considered excessive, as in the case of larger size kitcheners, but great care must be exercised not to interfere with the free circulation of the fire round the oven and under the hot plate and boiler. The "Quadrant," "Zeus," "O'B. T.," and "Cookwell" ranges are among the best patterns. Of the portable type, the firm specially refer to the "Larbert," "Icis," and "Nonsuch" for their economical working.

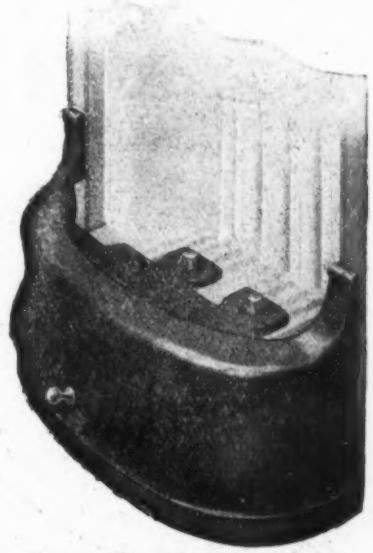
THE INTEROVEN STOVE COMPANY say:—"No doubt a large amount of coal is saved by converting old-fashioned grates into modern barless fires, but a far greater saving in the home is affected by doing away with the wasteful kitchen range, which we are sure you will agree consumes



quite 75 per cent. of the coal used in the average home. Not only is a large amount of coal saved, but for every kitchen range taken out and replaced with our stove a much heavier weight of iron finds its way back to the foundry to be made into shells or into our more economical convertible ranges through the scrapping of the wasteful kitchener." A development of the barless fire has been produced by the same company. This is called the "Bewty" fire, and of these we understand there are many thousands now in use. If, as is claimed, these are saving thousands of tons of coal, they must be claimed as valuable economic factors at the present time. The economics of household management are being so much better understood to-day that many old prejudices are disappearing and the public are becoming educated to the advantages which modern inventions provide for the convenience of small households. Amongst these a noteworthy place has been occupied by the plan for combining the pleasantness of the open fire with the ready service of the oven. In countless instances the cooking arrangements have dominated the aspect of the living apartment, and in order that the comfort and appearance of the living room might be preserved without prejudice to the practical needs of the cook, the design known as the "Interoven" was introduced. The idea of this is to combine two stoves in one with the promised result of getting one scuttle of coal doing the cooking, the heating of the bath water, and the maintenance of a cosy fire all day. The "Interoven" claims to supplant the wasteful kitchen range; to cook for eight or ten persons, and at the same time heat the bath boiler. It is instantly convertible from a cooking stove to a sitting room stove, and the efficient work of the cooking stove is as marked as is the agreeable effect of the open fire when it is converted to the latter from the former. As a matter of fact we should think the merit of the invention is so considerable as to justify it being produced in various good architectural designs beyond the simple type at present shown.

MESSRS. MUSGRAVE & Co., LTD. (St. Ann's Iron Works, Belfast), although officially listed in certain journals under the heading "Grates and Range Manufacturers," do not manufacture grates of the domestic pattern, but their stoves, "The Musgrave Slow Combustion Stove," is a well-known commodity for the last 50 years. For this stove is claimed a greater efficiency in warming capacity than any heating apparatus on the market, and at the minimum cost in fuel. Whilst quite suitable for domestic warming, and largely used for that purpose, it has occupied a prominent place since the beginning of the war in the heating of munitions factories, engineering works, &c. The firm send us a list of present users, many of the names being prominent engineers, which gives some idea of the utility of the stoves as a cheap and efficient method of heating.

MESSRS. W. N. FROY & SONS, LTD. (Brunswick Works, Hammersmith, London, W.), very naturally remark that economy must be effected through the stoves that are already in use, as it is impossible at the present time to introduce and supply any new type of stove, no matter



AN ADAPTABLE BARLESS FIRE.

how efficient or economical they may be. Their "Ideal Cosy" is an adaptable barless fire, old grates with bars being converted into a new and economical barless type by fixing an "Ideal Cosy" Adaptable Barless Fire. It is claimed that this fire pays for itself by reducing the consumption, while it gives a thoroughly up-to-date appearance to any grate. "The advantages," they state, "of the barless fire over the old-fashioned stove with horizontal or vertical bars are well known. With the bars most of the heat goes up the chimney, and a large amount of coal is consumed with unsatisfactory results, whereas, with the barless fire, the heat is all thrown into the room and the maximum radiation is obtained, with the minimum consumption of coal." The "Ideal Cosy" Adaptable Fire is easy to fix, and can be fitted quickly by any inexperienced person.

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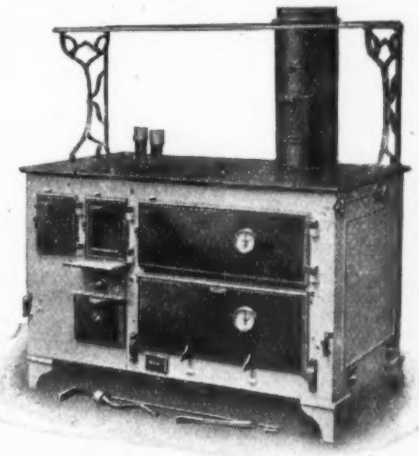
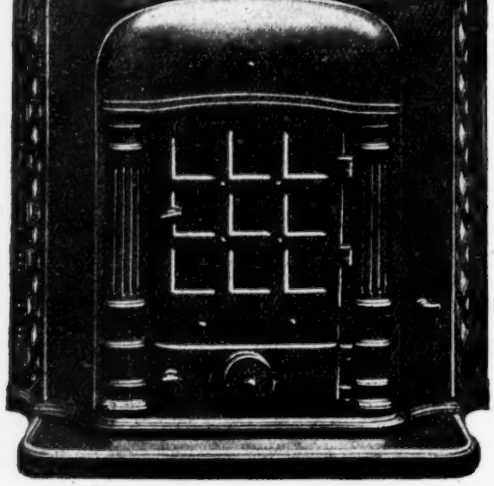
The efficient warming and ventilation of the home has long been the object of the LONDON WARMING AND VENTILATING CO. In fact, we



"KOOKSJOIE" PATENT RANGE.

suppose the company may be considered to be the pioneers of anthracite burning in this country. When the earlier patterns were introduced few householders had heard about anthra-

cite coal. But the patent anthracite stoves brought to the front that ideal fuel as a labour-saving, economical and efficient substitute for ordinary smoky, bituminous coal. We give an illustration of the "Kooksjoie" patent range, which is entirely self-setting. It need never go out and is always ready for work day and night. It gives a constant and abundant supply of hot water day and night. It has, of course, no fumes, dust, or small, and the flues only need cleaning every six months and the chimney once in five years. It will burn also wood, peat, coke, ordinary coal, or any other fuel. We should say



"HOME COMFORTS" GRATE.

few articles of manufacture so thoroughly speak for themselves as do those of the LONDON WARMING AND VENTILATING CO. The "Florence" grate has an open fire that will burn anthracite as well as any other kind of fuel. It can be made to draw up quickly and intensify the fire by a movement of the patent canopy, or to burn very slowly. It will burn many hours without any attention. One fire—no larger than usual—supplies not only the usual radiant heat, but warms other rooms from the heat generated in the boiler behind, which is distributed to radiators fixed in suitable places.

As an example of the way in which our industrial firms are helping forward the national work, we may instance MESSRS. HAYWARDS, LTD., whose name is familiar to all architects. This firm, recognising the seriousness of present circumstances and the coal shortage, has placed the services of its heating engineer at the disposal of the Coal Controller's Department, who is prepared to advise, gratis, in any circumstances where saving of fuel, &c., is a possibility for the general good. Messrs. Haywards are carrying out large amounts of Government work, but have, notwithstanding, been able to look well after the interests of those who have placed work with them. Their speciality, as our readers know, is the heating and ventilating department, and they have carried out large systems of Plenum heating and ventilation for the Government, ventilating and heating of special dope rooms for aircraft works, &c., heating by steam and hot water for buildings occupied for special war work, and private work for hospitals and other buildings. Their instalment of low-pressure hot-water circulation for buildings of moderate size is simple and reliable when properly schemed and used.

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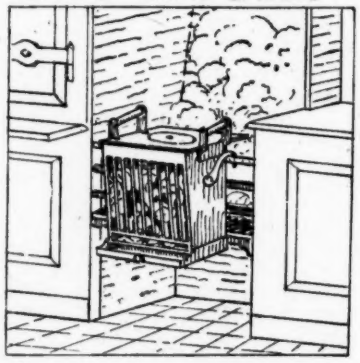
We may add here that householders who have closed-in stoves capable of burning anthracite are asked by the Coal Controller to use that kind of coal. The Welsh anthracite mines are not working full time, and as it is desired to make full use of all that can be produced, householders who can use anthracite should apply for it in place of ordinary coal.

Well-lighted and heated hotels and restaurants will be unknown this winter. The rationing of hotels and restaurants and the catering trade generally, under the Fuel and Lighting Order, is being specially dealt with by the Coal Controller, who urges proprietors of these establishments to assist in every way by careful use of coal, gas and electricity, and asks the public to co-operate by not demanding fire and light that can possibly be done without. Every form of display by means of lighting would set a bad example to householders, who are showing every intention to use less coal and light in their homes. The Controller asks for subdued lighting in lounge and dining rooms and for the abolition of multiple lights in bed rooms.

## THE "CALTO" COAL SAVER.

OUR attention has been called to an invention which seems to possess points likely to be of advantage at the present time. It is the joint invention of Mr. Theo. S. McCallum, civil engineer, Huddersfield, and Mr. Fredk. Musto, architect, York. The "Calto," as it is called, consists of a self-contained iron fire-box, which is hung in front of the bars of the ordinary kitchen range. Although chiefly intended for the ranges with open fires (known as "Yorkshire" ranges), so largely used in the north of England, it may also be applied to most other ranges, as well as to sitting-room grates. The "Calto" has had, we understand, over a year's practical trial, and it has proved itself capable (under normal conditions of coal supply) of saving about 55 per cent. of coal; and it is claimed that the saving will amount to, say, 42 per cent. on the rationed basis, that is, if the coal for the kitchen fire is reduced *pro rata*. Radiation takes place in every direction, and, as the fire is not in a recess (like the ordinary fireplace) there is not a mass of bricks and ironwork to absorb the heat, which is concentrated upon the work to be performed instead of largely escaping up the chimney unused. No fixing is necessary and no alteration of the existing fireplace, while it can be attached in a minute. Provision is made for heating the hot water boiler and the ordinary oven. When either is required to be done, the "Calto" is merely placed inside the fireplace and the proper damper opened. By the concentration of the heat to the required flue, the work is done much more

"CALTO" COAL SAVER



quickly than with the ordinary fire and at an expenditure of much less fuel. As soon as the use of the oven is finished, the "Calto" is removed. The same applies to the boiler for hot water. In the majority of houses it is only on one or two days a week that many gallons of hot water are required. Other advantages are claimed for the invention, one of which is that the "Calto" can be used as a slow combustion stove, or may have a bright open fire. The top plate is removable. We give an illustration of the apparatus, which has had over one year's practical trial.

## THE COMPETITION SYSTEM.

IT is, perhaps, a promising sign when the intelligent layman takes an interest in professional matters, and though the subject of reform in architectural competition is not one of pressing importance at the present time, it is a matter which is no doubt being considered by the Committee of the Royal Institute of British Architects which is now hearing evidence as to the future of architects and the architectural profession. That being the case, it may serve a useful purpose to put on record the following opinion from a letter recently received by an architect of our acquaintance:—

"I think the competition system is a disaster to your profession. You are treated like a lot of schoolboys setting out to write prize essays. It is evidently assumed that there is no element of skill or experience needed in the erection of our public buildings, but the ability to knock off a nice design on paper that will tickle the fancy of some gentleman appointed as assessor and anxious to encourage the rising generation. The best work in the country is thus given to the inexperienced, because the self-respecting architect with an established practice cannot be expected to submit his talents to the sort of gamble that is involved in competing with all and sundry who can put pencil on paper and knock off a nice working plan and elevation. And the worst of it is that thus the maturer skill and judgment that come with years are absent from practically all these modern buildings. What wonder if architecture sinks into a secondary art instead of being to the arts what grand opera is to music, painting, poetry, song and dance, a synthesis of the best, the highest expression of the human mind in form and colour.

"The young student, carefully coached in the grammar of his art, by the nature of things lacks the confidence of his elders in his power of design. He is still feeling his way only. His wings are not strong. He dare not offend the canons, because his reputation is still at stake. But if he does strike out boldly and show originality, be sure that it will instantly be crushed; his design will fail to meet approval. His work, therefore, is made with an eye, not so much to express a developed individuality as to please his patron; and his patron, as often as not, is a committee devoid of taste or appreciation of the best. That system displaces the centre of gravity of the art from the seat of its strength—the men who have fought for their ideas and the advancement of the art and who have triumphed over difficulties; who have learned the realities of the materials in which they work, and who have learned to stamp their personality on their work.

"The system is disrespectful to the noblest of professions. In all walks of life respect is due to experience as well as to training and education, to the men who have not only developed new ideas, but have fought the battle and won their spurs in asserting them. It may be that talent is discovered thus; but it is talent which has never been tried in the fire; which seeks an easy entrance to an arduous profession by concentrating on one aspect of it only. I do not deprecate the holding of competitions to evoke new ideas; but to rely on these for the expression in art of our national character, in this art especially—an art which affects our daily lives—to that I say, 'No!'"

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### Building Trade and Certified Occupations.

The Property Owners' Protection Association states, we read, that as a result of the representation as to special consideration being given to men engaged in house and shop repairs, the Minister of National Service has included the building trade industry in the list of certified occupations.

### Book Received.

COAST EROSION AND PROTECTION. By Ernest R. Matthews, Assoc.M.Inst.C.E. Second edition, enlarged, 12s. 6d. net. (London: Charles Griffin & Co., Ltd.)

# THE BUILDING TRADE.

## TWO CASES UNDER THE INCREASE OF RENT ACT.

Two cases under the Increase of Rent and Mortgage Interest (War Restrictions) Act, 1915, deserve attention. In the first case, W. H. Sutton & Sons *v.* Hollerton (*Weekly Notes*, July 6), the defendant was the tenant of a house within the Act, let to him before the war at a weekly rent of 8s. 9d., the landlord paying the rates. The rates were increased in the year 1915–1916 by 12s. 2d. on the corresponding year: in the following year by 2s. 9d., and in the year 1917–18, 6s. 9d., a total of £1 1s. 8d. in the three years.

In the Act, by section 1 subs. (1) 4, it is provided: "Where the landlord pays the rates chargeable on . . . the occupier of any dwelling house an increase of the rent of the dwelling house shall not be deemed an increase for the purposes of this Act if the amount of the increase does not exceed any increase in the amount for the time being payable by the landlord in respect of such rates over the corresponding amount paid in respect of the yearly, half-yearly, or other period which included the third day of August 1914. . . ."

A notice has to be served of the intention to increase the rent and the increase cannot be recovered until four clear weeks after the service of notice. Particulars have also to be given where the increase is in respect of rates.

The plaintiff, on January 5, 1918, had served the notice and particulars on the defendant claiming an increase of rent as from February 2 of one shilling, that is to say, he had taken the total increase in the rates over the three years, viz., £1 1s. 8d., and divided it by the 21 weeks which had elapsed from February 2 to June 29.

The Court held that this was an erroneous course to adopt, as the increase in the rates could not be allowed to run on from year to year and then be claimed in the current year. The proper course to adopt was to attribute a proportionate part of the increase in the rates for the year to the period of that year in respect of which the rent was paid. This made the increase in rent about twopence a week, which was what the defendant had contended was right.

The second case, Steel *v.* Mahoney (*Weekly Notes*, July 13), is rather more complicated. The defendant in that case was a weekly tenant of a house within the Act before the war at a rental of 9s., the poor rates at that time being 7s. 10d. The landlord's interest in the house was mortgaged and as in 1915 the rate of mortgage interest was raised and the poor rates had been increased to 8s. 10d., the landlord had increased the weekly rent by one shilling. The Act was not then in force, so he was entitled to do this.

When the rent was thus raised the rating authorities, according to a scale in force in the district, had raised the rateable value of the house from £13 15s. to £15 10s., and the rates became payable on the latter assessment.

When the Act came into force on December 23, 1915, the increase in rent became irrecoverable as from November 25, 1915, and the plaintiff, to comply with the Act, gave the defendant notice that the rent would be reduced to 9s., and then particulars were given of the increase in the rates which would bring the rent up to 9s. 8d. In these particulars a mistake had been made in the amounts of the rates and the true figures would give an increase of about fourpence a week and in the action the plaintiff only claimed this sum.

Three points were raised by the defendant. First, it was said that the rates should be based on the pre-war rental, and not on the rental which had become illegal on the passing of the Act, and the increase of rates based on the pre-war valuation of £13 15s. would be threepence and not fourpence. The Court negatived this contention saying that the question was the amount of rates in fact payable by the landlord, not what would have been payable had the valuation remained the same. Secondly, it was contended that a valid notice was made a condition precedent to a right of action and this notice was inaccurate in amount and invalid. and thirdly, it made the increase in rent commence on the following day to the date of the notice instead of from the expiration of four weeks and was thus a one-day notice.

The Court held that the inaccuracy in amount was not material, for the defendant was not damnified by being given a notice of too large an increase in rent if when the claim was made it was reduced to the proper figure.

Lastly, it was held that section 1, subs. (1) vi did not debar the landlord from claiming the increase of rent as from the date of notice, it only suspends the remedy and prevents the increase being sued for until four weeks have expired.

It will be seen these two cases have decided several points which are of importance under the Act and a study of the decisions may be of service to those affected by this complex legislation.

## PROPOSED NEW BUILDINGS AND OTHER WORKS.*

**In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; L.G.B. for Local Government Board; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.**

BENTLEY.—Permission has been granted for the erection of a national kitchen on land belonging to the U.D.C.

BLYTH.—A L.G.B. inquiry has been held by Mr. George L. Pepler, F.S.I., respecting the application of the U.D.C. for authority to prepare a town planning scheme. On behalf of the Thoroton and Croft Trustees, a request was preferred to have excluded from the scheme land situated between Morpeth-road and the river, on account of probable commercial development. The N.E.R. Company offered no opposition, but sought the insertion of a clause safeguarding the company's interests, and the Council's representative intimated their willingness to accept the suggestion.

CALNE.—Plans passed by T.C. — New buildings to be erected by Messrs. C. & T. Harris & Co. in Church-street, and a bridge over the street connecting the two factories, and also of new buildings to be erected at the rear of 17, Church-street.

CROWBOROUGH.—The Committee appointed by the Parish Council to consider the housing needs of the district has reported that fifty cottages are required.

DUNDEE.—The Housing Committee has had under consideration a letter from the local branch of the Shipwrights' Society, pointing out that a request had been made for shipwrights for the new shipbuilding yard at Stannergate, but that the difficulty was the absence of housing accommodation, and they asked that the new housing scheme at Craigie be proceeded with. Baillie Buist said Dundee was further forward with its housing schemes than any other city in Scotland. The Caledon Shipbuilding Company had shown a notable example to manufacturers in Dundee, so far as the housing of the people was concerned, because they had decided to erect two model cottages on the town-planning scheme ground.

EDINBURGH.—The Dean of Guild Court has issued a warrant for the conversion of the Tabernacle, Leith-walk, into a hostel for sailors.

FORMBY.—The Board of Trade has confirmed the Lancashire and Yorkshire (Formby Light Railways) Order, 1918, made by the Light Railway Commissioners authorising the construction of light railways at and near Formby.

FULHAM.—Application is to be made by the B.C. to the L.C.C. to borrow £4,700 for alterations and improvements to the dust destructor. Drainage plans passed: At 4 and 6, Star-road, for Messrs. Elms & Jupp; at Darracq Motor Engineering Co.'s Works, for Messrs. W. King & Son; at Rostrevor Garage, Rostrevor Mews, for Mr. G. Roberts.

HACKNEY.—Drainage plans passed by B.C.: At Public Library, Mare-street, for Messrs. W. Silk & Son; at factory premises, 84, Gainsborough-road, for Vickets, Ltd.

IRLAM.—Messrs. Dolan & Sons, contractors, of Warrington, have commenced the preliminary work in connection with the erection of 160 dwellings for workers at Irlan. It is expected that some of the houses will be ready for occupation before the end of the year.

LAUNCESTON.—The T.C. has adopted a scheme for the erection of thirty houses for the working classes as soon after the war as possible.

LEWISHAM.—Drainage plans passed by B.C.:—At 30 and 32, Rhyme-road, for Mr. J. H. Forbes; at Lewisham Military Hospital, for Mr. V. E. Young.

NEWPORT (MON.)—The Housing Committee has decided to recommend the Corporation to immediately proceed with the erection of 1,000 houses on 40 acres of land on the east side of the river. It is estimated that the scheme will cost between £400,000 and £500,000.

PLYMOUTH.—Plans passed by T.C.:—Sanitary improvements, 13, Buckland-terrace, for the Ancient Order of Foresters; bathroom, &c., 13, St. James-terrace, for the Devon and Cornwall Nursing Association; alterations to workshop, 35, Cobourg-street, for Mr. C. P. Skinner.

PORT EDGAR.—At a meeting of Linlithgow District Committee of the County Council a letter was read from the L.G.B. as to their scheme for providing 1,300 houses at Port Edgar for the Admiralty's workpeople and families, and requesting to know whether the District Committee were prepared to provide road, water, drainage, and lighting facilities for this proposed new town. The District Committee instructed the Clerk to reply that they were sympathetic with the scheme, but before giving a definite reply as to roads, water, and drainage, &c., they desired to see the plans of the area proposed to be taken in, and also of the class of the houses it was intended to erect.

RHYMNEY.—At the last meeting of the Rhymney Valley Sewerage Board, the engineers, (Messrs. Willcox and Raikes) reported that works to the value of about 46 per cent. of the accepted tender had been completed on Contract No. 3 in about 140 per cent. of the contract time of two-and-a-half years.

SALFORD.—Plans passed by T.C.: Construction of motor garage and workshop, Bolton-road, Queen-street, and Torrens-street, Pendleton; chimney, Hodge-lane, Pendleton; sanitary accommodation, premises, Southall-street, Salford. Alterations and additions to works, Harrison-street, Salford; premises, 9, Hanover-gardens, Broughton; Victoria Theatre, Great Clowes-street, Broughton; Olympia Picture Theatre, West-street, Pendleton; works, Greengate, Salford.

SEAFORD.—The U.D.C. has postponed the consideration of its housing scheme.

SOUTH AFRICA.—In his report on the trade of South Africa in 1917, Mr. W. G. Wickham, H.M. Trade Commissioner, says the accumulation of overdue orders and of postponed development in regard to electricity, water supply and sanitation will probably by the time normal trade conditions are once more in sight represent a very large amount of business.

SOUTH SHIELDS.—The L.G.B. has given sanction to the Corporation to borrow the amount required for the purchase of the Cleadon Park estate for various public purposes. The estate comprises a mansion, servants' houses, farm buildings, gardens, and extensive acreage, and the proposal is to provide workmen's dwellings, hospital accommodation, &c.

STOCKTON-ON-TEES.—The late Mr. T. Lascelles King has left £4,000 for the restoration of the parish church; also a portion of the residue of his estate for the building of a north transept of the church.

ST. HELENS.—Pilkingtons, of St. Helens, are stated to have purchased from Sir Gilbert Greenall, Bart., the Eccleston Hall estate on the borders of the town, with the intention of building a garden city for the benefit of their workmen and the families of workmen who have served in the war. The estate, some 700 acres in extent, with over 50 acres of water, is ideally situated for a garden city, lying in the valley between St. Helens and Prescot, and is principally agricultural land.

STRETFORD.—Plans passed by U.D.C.: New gas main, Warwick-road, for the Stretford Gas Co.; additions to power station, Trafford Park-road, for the Trafford Power and Light Supply (1902), Ltd.; workshops, stores, conveniences, &c., Warwick-road North, for Messrs. W. T. Glover & Co., Ltd.; engineer's office, &c., Mosley-road, for Messrs. H. N. Morris & Co., Ltd.; canteen, Trafford Wharf-road, for the Manchester Dry Docks Co., Ltd.

SUNDERLAND.—It has been decided by the Sunderland Royal Infirmary to erect a new physics' clinic, which will provide, besides orthopaedic treatment, hydropathic treatment. The cost of the building and its equipment is estimated at between £4,000 and £5,000.

SWANSEA.—Plans passed by T.C.:—Additions, Ty'n-y-Graig House, near Mount Pleasant, for Mrs. F. S. Williams; additions at Morriston Silica Brickworks, Sway-road, Morriston, for the Morriston Silica Brick Co.; additions, Central Dry Dock, Harbour Trust-road, for the Ocean Dry Docks Co., Ltd.; coal-house, "Hill-crest," Park View, for Mr. Edwin D. Davies; additions, No. 7, Rutland-street, for Messrs. Emlyn Lewis & Co.; bakehouse, No. 1, Danygraig-terrace, for Mr. W. E. Allen.

TYNEMOUTH.—A special appeal is being made for a fund to extend the Victoria Jubilee Infirmary.

WALSALL.—The Health Committee report that at

*See also our list of Competitions, Contracts, &c., p.204

the end of the war it will probably be necessary to expend £1,000 on alterations and improvements at the Epidemic Hospital.

WEYMOUTH.—Plan passed for Conversion of Rodwell Villa, Rodwell-road, into separate house and two flats (Messrs. S. Jackson & Sons), for Mr. Albany Ward.

YORK.—The Health Committee recommend the City Council to carry out the suggested arrangements in respect of the adoption of a portion of the Fairfield Estate as a sanatorium, subject to the necessary consents being obtained, and to put in hand the work to enable the institution to be opened at as early a date as possible.

### FIRES.

BERMONDSEY.—Much damage was done on Saturday night to a warehouse of Messrs. Spillers & Bakers, Dockhead.

BRADFORD.—Damage has been done by fire to the premises of Mr. W. Hinchcliffe, bobbin manufacturer, 15, Hall-lane.

DUNDEE.—Damage estimated at several thousands of pounds has been caused by fire at the Lawside Foundry, Lochee, belonging to Messrs. Lee, Croll & Co., engineers.

GLASGOW.—Damage amounting to about £8,000 has been caused by fire at 33, Anderston Quay, Glasgow. A four-storey building occupied by Messrs. Muir & Weir, sack manufacturers, was burned out.

LOWE-TOFT.—A large net store situated off the Avenue, belonging to the County Fishing Co., has been destroyed by fire.

SHEFFIELD.—Damage estimated at £1,000 was caused by fire at the Owlerton Bridge Steel Works owned by Messrs. Eaton & Booth.

## Competitions, Contracts, &c.

**For some contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this number.** Contracts—; Competitions—; Public Appointments xxxiv; Sales by Auction xxxvi Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

### ENGINEERING, IRON AND STEEL.

OCTOBER 4.—**Manchester.**—PIPEWORK.—The Electricity Committee of the Corporation invite tenders for the supply, at their Stuart-street Generating Station, of high and low pressure steam and feed pipework and supports, including alterations to existing pipework. Specification of Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

### ROAD, SANITARY, AND WATER WORKS.

OCTOBER 7.—**Bedlington.**—ROAD MATERIALS, &C.—The Urban District Council invites tenders for road metal and road roller. Particulars from Mr. Wm. Hall, Acting Surveyor, Bedlington, to whom samples of each sized material must be sent.

## Auction Sales.

*OCTOBER 2.—**London.**—There will be an unreserved sale of Government motor vehicles at Aldridge's, St. Martin's-lane, W.C. 2, by order of The Surplus Government Property Disposal Board. On view September 30 until sale. Catalogue on application.

*NOVEMBER.—**Herts and Middlesex**—Messrs. Knight Frank & Rutley will offer in November next, at the Hanover-square estate room, the residential and agricultural property known as the Copped Hall Estate, in the parishes of Totteridge and Hendon, embracing about 500 acres. Solicitors, Messrs. Thorowgood, Tabor & Hardcastle, 11, Copthall-court, E.C., and Messrs. Rider, Heaton, Meredith & Mills, 8, New-square, Lincoln's Inn, W.C. 2. Auctioneers, Messrs. Knight, Frank & Rutley, 20, Hanover-square, W. 1.

## Public Appointments.

***East Africa.**—The Medical Department of East Africa require the services of Sanitary Inspectors. Salary £200–£10–£250. Apply at once by letter to the Crown Agents for the Colonies, 4, Millbank, London, S.W. 1.

***Norwich.**—A surveyor's and architect's clerk of works is required by the War Department Valuer, 62, Thorpe-road, Norwich. Applications to be made by letter to above address.

## TRADE NEWS.

We are informed by the British Roofing Co., Ltd., that in order to facilitate the output of orders consequent to their increasing business, they are, on the 30th inst., removing to more extensive premises at Tower House, 40, Trinity-square, E.C. 3.

## RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur :—

| | Masons. | Bricklayers. | Carpenters, Joiners. | Plasterers. | Slaters. | Plumbers. | Painters | Masons' Labourers. | Bricklayers' Labourers. | Plasterers' Labourers. |
|---|---|---|---|---|---|---|---|---|---|---|
| | d. | d. | d. | d. | d. | d. | d. | d. | d. | d. |
| Aberdare | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Accrington | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/-§ | 1/-§ | 1/-§ |
| Altrincham | 1/5§ | 1/5§ | 1/5§ | 1/5§ | 1/4§ | 1/6§ | 1/5§ | 1/1§ | 1/1§ | 1/1½§ |
| Ashton-under-Lyne | 1/5§ | 1/5§ | 1/5§ | 1/5§ | 1/4§ | 1/6§ | 1/5§ | 1/1§ | 1/1½§ | 1/1½§ |
| Barnsley | 1/3§ | 1/2 | 1/1½ | 1/- | 1/1½§ | 1/1 | 11 | 11 | 11 | 11 |
| Barrow-in-Furness | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2 | 1/- | 1/- | 1/- |
| Barry | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Bath | 1/1 | 1/1 | 1/1 | 1/0½ | 10/½ | 1/1 | 1/- | 10½ | 10½ | 10½ |
| Bedford | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 10 | 10 | 10 | 10 |
| Birkenhead | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/2½§ | 1 2½§ | 1/2½§ |
| Birmingham | 1/4 | 1/4 | 1/4 | 1/4 | 1/3½ | 1/4 | 1/3§ | 1/1 | 1/1 | 1/1 |
| Bishop Auckland | 1/2½ | 1/2½ | 1/4 | 1/2½ | 1/2½ | 11½ | 11 | 11 | 11 | 11 |
| Blackburn | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/-§ | 1/-§ | 1/-§ |
| Blackpool | 1/- | 1/2 | 1/2 | 10½ | 8½ | 1/- | 10½ | 8 | 8 | 8 |
| Bolton | 1/5§ | 1/5§ | 1/5§ | 1/4§ | 1/3§ | 1/6§ | 1/5§ | 1/1§ | 1/-§ | 1/1§ |
| Bournemouth | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/- | 10½ | 10½ | 10½ |
| Bradford | 1/3½ | 1/3½ | 1/3 | 1/2½ | 1/2½ | 1/3 | 1/1 | 1/1 | 1/1 | 1/1 |
| Bridgwater | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 11 | 9½ | 9½ | 9½ |
| Brighton | 1 1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/- | 11 | 11 | 11 |
| Bristol | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Burnley | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/3½§ | 1/-§ | 1/-§ | 1/-§ |
| Burton-on-Trent | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/0½ | 10½ | 10½ | 10½ |
| Bury | 1/5§ | 1/5§ | 1/5§ | 1/3 | 1/3½§ | 1/6§ | 1/4§ | 1/-§ | 1/0½§ | 1/0½§ |
| Cambridge | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/- | 10½ | 10½ | 10½ |
| Cardiff | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3½ | 1/2 | 1/- | 1/- | 1/- |
| Chatham | 10½‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 9½‡‡§ | 8‡‡ | 8‡‡ | 8‡‡ |
| Chelmsford | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 11 | 11 | 11 | 11 |
| Cheltenham | 1/0½ | 1/0½ | 1/0½ | 1/- | 1/- | 1/0½ | 10½ | 10½ | 10½ | 10½ |
| Chester | 1/3§ | 1/3§ | 1/3§ | 1/3§ | 1/3§ | 1/3§ | 1/2§ | 1/-§ | 1/-§ | 1/-§ |
| Chesterfield | 1/- | 1/2 | 1/1 | 11 | 10 | 11 | 1/- | 8-8½ | 8-8½ | 8-8½ |
| Colchester | 10 | 10½ | 10½ | 10 | 10 | 11 | 8½ | 7½ | 7½ | 7½ |
| Coventry | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2½ | 1/0½ | 1/0½ | 1/1 |
| Crewe | 1/- | 1/- | 1/0½ | 1/0½ | 1/- | 1/- | 1/2 | 8 | 8 | 8 |
| Darlington | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/3½ | 1/- | 1/3 | 10½ | 10½ | 10½ |
| Derby | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/0½ | 11 | 11 | 11½ |
| Doncaster | 1/- | 1/1 | 1/1 | 10½ | 10½ | 10 | 9½ | 10½ | 10½ | 10½ |
| Dudley | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/3 | 1/1 | 11 | 11 | 11½ |
| Durham | 1/2 | 1/2 | 1/1½ | 1/2 | 1/1½ | 1/10 | 1/0½ | 9 | 9 | 9 |
| East Glam. and Mon. Valleys | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Exeter | 1/- | 1/- | 1/- | 1/- | 1/- | 1/0½ | 11 | 10 | 10 | 10 |
| Folkestone | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 10 | 9 | 9 | 9 |
| Gloucester | 1/0½ | 1/0½ | 1/0½ | 1/0½ | 1/0½ | 1/0½ | 11½ | 10½ | 10½ | 10½ |
| Grantham | 9½ | 10 | 9½ | 9½ | 10 | 8½ | 8 | 8 | 7½ | 8 |
| Grays | — | 1/- | 1/- | — | — | 1/- | 10½ | — | 10 | 10 |
| Grimsby | 1/2§ | 1/2§ | 1/2§ | 1/2§ | 1/2§ | 1/2§ | 1/2§ | 1/-§ | 1/-§ | 1/-§ |
| Great Yarmouth | 10 | 10 | 10 | 10 | 10 | 10 | 8½ | 7 | 7 | 7 |
| Guildford | 1/1 | 1/- | 1/- | 1/1 | — | 1/1 | 11½ | 9½* | 9½ | 10 |
| Halifax | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/1 | 11‡ | 11½ | 11½ |
| Harrogate | 1/-§ | 1/-§ | 1/- | 1- | 1- | 1/2 | 1/- | 10 | 10 | 10 |
| Hartlepools | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2 | 1/2 | 1/3 | 1/0½ | 1/0½ | 1/0½ |
| Hastings | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 7½ | 7½ | 7½ |
| Hereford | 11½ | 11½ | 11½ | 11½ | 11½ | 11½ | 10½ | 9½ | 9½ | 9½ |
| Huddersfield | 1/2½ | 1/2½ | 1/3 | 1/1 | 1/1 | 1/2 | 11 | 11½ | 11½ | 11½ |
| Hull | 1/3 | 1/4§ | 1/3 | 1/3 | 1/3 | 1/3 | 1/3½ | 1/1 | 1/1 | 1/1 |
| Ipswich | 1/1½ | 1/1½ | 1/1½ | 1/2 | 1/2 | 1/2½ | 1/0 | 11 | 11 | 11 |
| Lancaster | 1/1½ | 1/1½ | 1/2 | 1/1½ | 1/1½ | 1/- | 1/1½ | 11 | 11 | 11 |
| Leamington Spa | 11½ | 11½ | 11½ | 11½ | 11½ | 11½ | 10½‡ | 8½ | 8½ | 8½ |
| Leeds | 1/3½ | 1/3½ | 1/3 | 1/2 | 1/2½ | 1/3 | 1/0½ | 1/0½ | 1/0½ | 1/1 |
| Leicester | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/0½ | 11½ | 11½ | 1/- |
| Lincoln | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/0½ | 10½ | 10 | 10½ |
| Liverpool | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/6§ | 1/2½§ | 1/2½§ | 1/2½§ |
| Llanelly | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 9/- | 1/- | 1/- |
| London | 1/3½‖ | 1/3½‖ | 1/3½‖ | 1/3½‖ | — | 1/3½‖ | 1/0½‖ | 1/2½‖ | 1/2½‖ | 1/2½‖ |
| Loughborough | 1/3½§ | 1/2½§ | 1/1½§ | 1/3½§ | 1/3½§ | 1/1½§ | 11§ | 1/0½§ | 11½§ | 1/0½§ |
| Luton | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/- | 11 | 11 | 11 |
| Maidstone | 11 | 11 | 11 | 10 | 10 | 11 | 10 | 8 | 8 | 8 |
| Manchester | 1/5§ | 1/5§ | 1/5§ | 1/5§ | 1/4§ | 1/6§ | 1/5§ | 1/1§ | 1/1½§ | 1/1½§ |
| Mansfield | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/0½ | 10½ | 10½ | 10½ |
| Merthyr Tydfil | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Middlesbrough | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2 | 1/2 | 1/3 | 1/0½ | 1/0½ | 1/0½ |
| Newcastle-on-Tyne | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2 | 1/3 | 1/4§ | 1/0½ | 1/0½ | 1/0½ |
| Newport, Mon. | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Northampton | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/- | 10½ | 10½ | 10½ |
| Norwich | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 11 | 9½ | 9½ | 9½ |
| Nottingham | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/2½ | 1/3½ | 1/1 | 1/0½ | 1/1½ | 1/0½ |
| Oldham | 1/5 | 1/5 | 1/5§ | 1/5§ | 1/4 | 1/4 | 1/5§ | 1/1½§ | 1/1½§ | 1/2§ |
| Oxford | 11 | 10½ | 10½ | 10½ | 10½ | 10½ | 9½ | 8 | 8 | 8 |
| Plymouth | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 11½¶ | 11 | 11 | 11 |
| Pontypridd | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Portsmouth | 1/- | 1/- | 1/- | 1/- | 1/- | 11 | 10 | 9½ | 9½ | 9½ |
| Preston | 1/3½ | 1/3½ | 1/3 | 1/2½ | 1/2 | 1/3 | 1/2½ | 11½ | 11½ | 11½ |
| Reading | 1/1 | 1/1 | 1/1 | 1/1½ | 1/2 | 1/1 | 11½ | 11 | 10½ | 10½ |
| Rochdale | 1/5§ | 1/5§ | 1/5§ | 1/4½§ | 1/3 | 1/6§ | 1/5§ | 1/1§ | 1/1§ | 1/1½§ |
| Rochester | 10½‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 11‡‡ | 9½‡‡ | 8‡‡ | 8‡‡ | 8‡‡ |
| Rugby | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/1½ | 1/0½ | 10½ | 10½ | 11½ |
| St. Albans | 1/- | 1/- | 1/2 | 1/- | 1/- | 1/- | 10§ | 9 | 9 | 9 |
| St. Helen's | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/5 | 1/3 | 11½ | 11½ | 11½ |
| Scarborough | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/- | 11½ | 10 | 10 | 10 |
| Sheffield | 1/3½ | 1/3½ | 1/3½ | 1/3 | 1/3 | — | 1/1½ | 1/0½ | 1/0½ | 1/0½ |
| Shrewsbury | 8½ | 11½ | 1/3 | 9½ | — | 8½ | 7 | 8½ | 8½ | 8½ |
| Southampton | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/- | 10½ | 10½ | 10½ |
| Southend-on-Sea | 10 | 10 | 10 | 10 | P'cework | 10 | 9 | 8 | 8 | 8 |
| Southport | 1/4 | 1/3 | 1/5 | 1/4 | 1/4 | 1/4 | 1/4 | 1/- | 1/- | 1/- |
| South Shields | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/3 | 1/4§ | 1/0½ | 1/0½ | 1/0½ |
| Stockport | 1/5§ | 1/5§ | 1/5§ | 1/4§ | 1/4½§ | 1/6§ | 1/5§ | 1/1 | 1/1 | 1/1 |
| Stockton-on-Tees | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2 | 1/2 | 1/3 | 1/0½ | 1/0½ | 1/0½ |
| Stoke-on-Trent | 1/0½ | 1/0½ | 1/0½ | 1/0½ | 1/0½ | 1/- | 11½ | 10 | 10 | 10 |
| Stroud | 11½ | 11½ | 11½ | 11½ | 11½ | 11 | 9½ | 9½ | 9½ | 9½ |
| Sunderland | 1/3½ | 1/3½ | 1/3½ | 1/3½ | 1/2 | 1/1½ | 1/4§ | 1/0½ | 1/0½ | 1/0½ |
| Swansea | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/2 | 1/- | 1/- | 1/- |
| Taunton | 1/-§ | 1/-§ | 1/-§ | 1/-§ | 1/-§ | 1/-§ | 11§ | 9½§ | 9½§ | 9½§ |
| Torquay | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 10 | 10 | 10 |
| Wakefield | 1/2½§ | 1/3§ | 1/2½§ | 1/2½§ | 1/2½§ | 1/2½§ | 1/1½§ | 10½ | 10½ | 10½ |
| Walsall | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/0½ | 11½ | 11½ | 11½ |
| Warrington | 1/5 | 1/5 | 1/5 | 1/5 | 1/5 | 1/5 | 1/4 | 1/1½ | 1/1½ | 1/2 |
| West Bromwich | 1/3½ | 1/3½ | 1/3½ | 1/4 | 1/3½ | 1/3 | 1/1½ | 1/0½ | 1/0½ | 1/0½ |
| Wigan | 1/4§ | 1/4§ | 1/4§ | 1/4§ | 1/3§ | 1/4§ | 1/5§ | 1/0½§ | 1/0½§ | 1/0½§ |
| Windsor | 1/- | 1/- | 1/- | 1/- | 1/- | 1/- | 10½ | 9 | 9 | 9 |
| Wolverhampton | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/0½ | 11 | 11 | 11 |
| Worcester | 1/- | 1/- | 1 - | 1/- | 1/- | 1/- | 10 | 10½ | 10½ | 10½ |
| York | 1/2§ | 1/2§ | 1/2§ | 1/2§ | 1/- | 1/- | 10 | 11½§ | 11½§ | 11½§ |

The Masons' rate given is for bankers: fixers usually ½d. per hour extra. * War bonus of 2s. per week granted. † War bonus of 3s. per week granted. ‡ War bonus of 3s. 6d. per week granted. ‡‡ War bonus of 5s. per week granted. ‖ Plus 1½d. per hour to men engaged on munition work. ¶ War bonus of 7s. 6d. per week granted. §These rates include all 12½ per cent. bonuses. [The above rates, unless otherwise shown, are exclusive of 12½ per cent. increase granted by the Committee of Production to workers engaged on munition work.—ED.]

# PRICES CURRENT OF MATERIALS.*

**[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]**

## BRICKS, &c.

| Per 1,000 Alongside, in River Thames. | £ s. d. |
|---|---|
| Best Stocks | 2 15 0 |
| Picked Stocks for Facings | 3 15 0 |

Per 1000, Delivered at London Goods Stations.

| | £ s. d. | | £ s. d. |
|---|---|---|---|
| Flettons | 2 3 0 | Best Blue Pressed Staffordshire | 6 15 0 |
| Best Fareham Red | 4 0 0 | Do. Bullnose | 7 0 0 |
| Best Red Pressed Ruabon Facing | 6 0 0 | Best Stourbridge Fire bricks | 9 5 0 |
| GLAZED BRICKS— | | | |
| Best White, Ivory, and Salt Glazed Stretchers | 17 17 6 | D'ble Str'tch'rs | 23 7 6 |
| Headers | 17 7 6 | D'ble Headers One Side and two Ends | 24 7 6 |
| Quoins, Bullnose and 4½in. Flats | 21 7 6 | Two Sides and one End | 25 7 6 |
| | | Splays and Squints | 22 17 6 |

Second Quality, £1 per 1,000 less than best.

Glazed bricks priced at so much each, 50 per cent. advance on list.

Permission to be obtained from Director of Supplies for Flettons, Wire Cuts, &c.

| | s. d. | |
|---|---|---|
| Thames Ballast | 12 0 | per yard, delivered |
| Pit Sand | 14 6 | |
| Thames Sand | 15 0 | „ „ 2 miles |
| Best Washed Sand | 15 6 | „ „ radius |
| ¾in. Shingle for Ferro-Concrete | 13 6 | „ „ Paddington. |

Per ton, delivered.

| | £ s. d. | | £ s. d. |
|---|---|---|---|
| Best Portland Cement | 3 3 0 | .. | 3 6 0 |

Do. £2 16s. 0d. alongside in 80-ton lots.
Ferrocrete 2s. 6d. per ton extra on above.
Best Ground Blue Lias Lime 2 2 6 at rly. depot.
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. The sacks are charged at 2s. 6d. each and credited at 2s. each if returned in good condition within three months.
Grey Stone Lime ..... 47s. 0d. per ton delivered.
Stourbridge Fireclay in s'cks 37s. 6d. per ton at rly. dpt.

## STONE.

| | s. d. |
|---|---|
| BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube | 1 7 |
| Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube | 1 8½ |
| Do. do. delivered on road waggons at Nine Elms Depot | 1 9½ |
| PORTLAND STONE— | |
| Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Mileage Station G.W.R., per ft. cube | 2 10½ |
| Do. do. delivered on road waggons at above stations, per ft. cube | 2 11½ |
| White basebed, 2d. per ft. cube extra. | |
| NOTE.—½d. ft. cube extra for every foot over 20 ft. average. | |

RANDOM BLOCKS—Per Ft. Cube, delivered at Rly. Dpot.

| | s. d. | | s. d. |
|---|---|---|---|
| Ancaster in blocks | 2 10 | Closeburn Red | 3 0 |
| Beer in blocks | 1 9 | Freestone | 3 0 |
| Grinshill in blocks | 2 6 | Red & White Mansfield random block | 4 8 |
| Darley Dale in blocks | 2 10 | Yellow Magnesian Limestone do. do | 3 9 |

YORK STONE—*Robin Hood Quality.*

| Delivered at any Goods Station London. | s. d. |
|---|---|
| Scappled random blocks ..... Per Ft. Cube | 5 10 |
| 6 in. sawn two sides landings to sizes (under 30 ft. super.) ..... Per Ft. Super | 4 6 |
| 6 in. rubbed two sides, ditto ..... „ | 4 11 |
| 3 in. sawn two sides slabs (random sizes) „ | 2 0 |
| 2 in. to 2½ in. sawn one side slabs (random sizes) ..... „ | 1 3 |
| 1½ in. to 2 in. ditto, ditto ..... „ | 1 1 |
| HARD YORK— | |
| Delivered at any Goods Station London. | |
| Scappled random blocks ..... Per Ft. Cube | 5 5 |
| 6 in. sawn two sides landing to sizes (under 40ft. super.) ..... Per Ft. Super | 4 2 |
| 6 in. rubbed two sides ditto ..... „ | 4 7 |
| in. sawn two sides slabs (random sizes) „ | 1 11 |
| 2 in. self-faced random flags ..... „ | 0 10 |

## MAXIMUM PRICES OF IMPORTED TIMBER.

### TIMBER CONTROL ORDER, 1918.

Pursuant to paragraph 3 of the Timber Control Order, 1918, the Controller of Timber Supplies hereby gives notice that until further notice the following shall be the maximum prices at which imported timber may be sold. These prices are per standard landed and in store.

WHITE SEA REDWOOD

| | 1st. £ | 2nd. £ | 3rd. £ | 4th. £ |
|---|---|---|---|---|
| 4" × 11 | 59 | 57 | 55 | 53 |
| 4" × 9 | 56 | 54 | 52 | 50 |
| 4" × 8 | 53 | 51 | 49 | 47 |
| 4" × 7 | 53 | 51 | 49 | 47 |
| 2½ & 3 × 11 | 58 | 56 | 54 | 51 |
| 2½ & 3 × 9 | 53 | 51 | 49 | 47 |
| 3" × 8 | 52 | 50 | 48 | 46 |
| 3" × 7 | 52 | 50 | 48 | 46 |
| 2½ & 7/8 | 52 | 50 | 48 | 46 |
| 2" × 11 | 58 | 56 | 54 | 51 |
| 2" × 9 | 53 | 51 | 49 | 47 |
| 2" × 8 | 52 | 50 | 48 | 46 |
| 2" × 7 | 52 | 50 | 48 | 46 |
| 3" × 6 unsorted | 47 | | | |
| 2½ × 6 unsorted | 47 | | | |
| 3" × 5 unsorted | 46 | | | |
| 2½ × 5 unsorted | 46 | | | |
| 2" × 6 unsorted | 47 | | | |
| 2" × 5 unsorted | 45 | | | |
| 2" × 4 unsorted | 45 | | | |

## TIMBER (*Continued*).

UNSORTED LARCHWOOD at 3rd Archangel Redwood Prices.
Boards, 1st and 2nd, £2 10s. extra.
Boards, 3rd and 4th, £1 10s. extra.

WHITE SEA WHITEWOOD.

| | 1st. £ | 2nd. £ | 3rd. £ | | 1st. £ | 2nd. £ | 3rd. £. |
|---|---|---|---|---|---|---|---|
| 3×11 | 57 | 55 | 50 | 3×8 u/s .. | 48 | | |
| 3×10 | 54 | 52 | 49 | 3×7 u/s .. | 48 | | |
| 3× 9 | 52 | 50 | 48 | 2½&2×8 u/s | 48 | | |

| | £ s. d. | | £ s. d. |
|---|---|---|---|
| 2½& 2×7 u/s | 48 0 0 | 2½× 5 u/s .. | 46 0 0 |
| 3 ×6½ u/s | 47 10 0 | 3 × 5 u/s | 46 0 0 |
| 2 ×6½ u/s | 47 10 0 | 2 × 5 u/s | 45 0 0 |
| 2½& 3×6 u/s | 47 0 0 | 2 × 4 u/s | 45 0 0 |
| 2× 6 u/s | 47 0 0 | | |

Boards, £1 10s. extra per std.

FEATHER EDGED BOARDS, £50 per std.
SAWN LATHS, 3s. 9d. per bundle.
U/S SLATING BATTENS (yellow and white and strips), £44.
5th ditto, £42.

SWEDISH AND NORWEGIAN FLOORING AND MATCHING.

U/S Red and White.

| Per 100ft. super. | Per 100 ft. super |
|---|---|
| 1½in. P.E. at 71/6 | ¾in. P.E. at 37/- |
| 1¼in. P.E. at 60/- | ⅝in. P.E. at 31/- |
| 1in. P.E. at 47/- | ½in. P.E. at 23/- |
| ⅝in. P.E. at 41/- | |

If tongued and grooved or tongued and grooved and matched, 9d. per square extra.

| | |
|---|---|
| 1in. × 11in. P.E. at £54 | 1in. × 9in. P.E. at £51 |
| 1in. × 10in. P.E. at £53 | 1in. × 8in. P.E. at £49 |

CANADIAN AND AMERICAN YELLOW PINE

| | 1st. £ | 2nd. £ | 3rd. £ | | 1st. £ | 2nd. £ | 3rd. £ |
|---|---|---|---|---|---|---|---|
| 3×12 and up | 80 | 69 | 67 | 3× 8 | 62 | 55 | 53 |
| 3×11 | 78 | 63 | 61 | 3× 7 | 60 | 53 | 51 |
| 3×10 | 66 | 58 | 56 | 3×4/6 | 58 | 51½ | 49 |
| 3× 9 | 64 | 56 | 54 | | | | |

*For complete specification and prices, see issue of September 6, page 148.*

## TILES.

| | Per 1,000 f.o.r. London. £ s. d. |
|---|---|
| Best machine-made tiles from Broseley or Staffordshire district | 4 15 0 |
| Ditto hand-made ditto | 5 0 0 |
| Ornamental ditto | 5 2 6 |
| Hip and valley tiles (per dozen) | 0 9 0 |

## METALS.

JOISTS, GIRDERS, &c.

Rolled Steel Joists, ordinary sections, basis price
Plain Compound Girders, ordinary sections
Plain Compound Stanchions
Angles, Tees, and Channels, ordinary sections
Flitch Plates
Cast Iron Columns and Stanchions, plain ordinary patterns

*Prices controlled by the Ministry of Munitions.*

WROUGHT-IRON TUBES AND FITTINGS—
(Discount off List for lot of not less than £4 net value delivered direct from works. 5 per cent. less carriage forward if sent from London stocks.)

| | Sizes up to and including 2 in. Tubes. | Fittings. | | Sizes 2½ in. to 6 in. Tubes. | Fittings. |
|---|---|---|---|---|---|
| Gas | 31½ | 35 | .... | 36½ | 37½ |
| Water | 26½ | 32½ | .... | 31½ | 35 |
| Steam | 21½ | 30 | .... | 26½ | 32½ |
| Galvanised Gas | 8½ | 27½ | .... | 12½ | 30 |
| „ Water | — | 25 | .... | 3½ | 27½ |
| „ Steam | 6½ *on* | 22½ | .... | 2½ *on* | 25 |

L.C.C. COATED SOIL PIPES—London Prices ex works.

| | Pipe. s. d | Bends, stock angles. s. d. | Branches, stock angles s. d. |
|---|---|---|---|
| 2 in. per yd. in 6 fts. | 4 2 | 3 1 | 3 8 |
| 2½ in. „ | 4 9 | 3 5 | 4 7 |
| 3 in. „ | 5 10 | 3 8 | 5 6 |
| 3½ in. „ | 6 6 | 4 7 | 6 6 |
| 4 in. „ | 7 1 | 5 2 | 7 3 |

RAIN-WATER PIPES, &c.

| | Pipe. s. d. | Bends, stock angles. s. d. | Branches, stock angles s. d. |
|---|---|---|---|
| 2 in, per yd. in 6fts. plain | 2 9½ | 1 8½ | 2 4½ |
| 2½ in. „ „ | 3 1 | 1 11½ | 2 9½ |
| 3 in. „ „ | 3 8 | 2 6½ | 3 8 |
| 3½ in. „ „ | 4 5 | 3 0 | 4 3½ |
| 4 in. „ „ | 4 10 | 3 6 | 5 3 |

L.C.C. DRAIN PIPES,—9 ft. lengths. London Prices. 4 in., 7s. 7d. .. 5 in., 9s. 2d. .. 6 in., 10s. 9d.

Per ton in London.

| | £ s. d. | | £ s. d. |
|---|---|---|---|
| IRON— | | | |
| Common Bars | 16 10 0 | to | 17 0 0 |
| Staffordshire Crown Bars—good merchant quality | 17 0 0 | .. | 17 10 0 |
| Staffordshire "Marked Bars" | 18 0 0 | .. | 19 0 0 |
| Mild Steel Bars | 21 0 0 | .. | 21 10 0 |
| Steel Bars, Ferro-Concrete quality, basis price | 19 10 0 | .. | 20 0 0 |
| Hoop Iron, basis price | 20 10 0 | .. | 21 10 0 |
| „ „ Galvanised | 33 0 0 | .. | — |
| Sheet Iron Black— | | | |
| Ordinary sizes to 20 g. | 23 0 0 | .. | 23 10 0 |
| „ „ 24 g. | 24 0 0 | .. | 24 10 0 |
| „ „ 26 g. | 25 0 0 | .. | 26 0 0 |
| Sheet Iron, Galvanised flat, ordinary quality— | | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 34 0 0 | .. | — |
| Ordinary sizes to 22 g. and 24 g. | 34 0 0 | .. | 34 10 0 |
| Ordinary sizes to 26 g. | 36 0 0 | .. | 36 10 0 |

## METALS (*Continued*).

| | Per ton in London. £ s. d. | | £ s. d. |
|---|---|---|---|
| Sheet Iron, Galvanised, flat, best quality— | | | |
| Ordinary sizes to 20 g. | 35 10 0 | .. | — |
| „ „ 22 g. and 24 g. | 36 0 0 | .. | — |
| Ordinary sizes to 26 g. | 39 0 0 | .. | — |
| Galvanised Corrugated Sheets— | | | |
| Ordinary sizes, 6 ft. to 8 ft. 20 g. | 33 0 0 | .. | Nominal prices only. |
| Ordinary sizes, 22 g. and 24 g. | 33 10 0 | .. | |
| Ordinary sizes, 26 g. | 32 10 0 | .. | |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker | 24 10 0 | .. | — |
| Best Soft Steel Sheets, 20 g. and 24 g. | 24 15 0 | .. | — |
| Best Soft Steel Sheets, 26 g. | 26 10 0 | .. | — |
| Cut Nails, 3 in. to 6 in. | 29 0 0 | .. | 30 0 0 |

(Under 3 in., usual trade extras.)

## LEAD, &c.

| Delivered in London. | £ s. d. | | |
|---|---|---|---|
| LEAD—Sheet, English, 4 lb. and up | 40 0 0 | .. | — |
| Pipe in coils | 40 10 0 | .. | — |
| Soil Pipe | 43 10 0 | .. | — |
| Compo pipe | 44 10 0 | .. | — |

NOTE—Country delivery, 20s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra. Orders for over 1 cwt. Sheet Lead or Pipe, or 28 lbs. Solder should be accompanied by a certificate or licence, which can be obtained from the Director of Materials [A.N.2 (E)], Hotel Victoria, S.W. Smaller quantities than the above can be obtained by making a written declaration to the Manufacturer or Merchant that the metal is wanted for urgent renewals or repairs, and giving the name of the Tin for which it is required.

| | | £ s. d. | |
|---|---|---|---|
| COPPER— | | | |
| Strong Sheet | per lb. | 0 2 3 | Class A certificate required for all Copper, Tin and Solder purchases. |
| Thin „ | „ | 0 2 4 | |
| Copper nails | „ | 0 2 3 | |
| Copper wire | „ | 0 2 4 | |
| TIN—English Ingots | „ | 0 3 9 | |
| SOLDER—Plumbers' | „ | 0 1 10 | |
| Tinmen's | „ | 0 2 4 | |
| Blowpipe | „ | 0 2 8 | |

## GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

| | Per Ft. | | Per Ft. |
|---|---|---|---|
| 15 oz. fourths | 7d. | 32 oz. fourths | 10d. |
| „ thirds | 7½d. | „ thirds | 11d. |
| 21 „ fourths | 8d. | Fluted, Obscured and Enamelled Sheet, | |
| „ thirds | 8½d. | | |
| 26 „ fourths | 9d. | 15 oz. | 7½d. |
| „ thirds | 9½d. | 21 „ | 8½d. |

Extra price according to size and substance for squares cut from stock, and only small quantities can be supplied without an A Certificate.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

| | Per Ft. |
|---|---|
| ¼ Rolled plate | 5½d. |
| ⅜ Rough rolled and rough cast plate | 6d. |
| ½ Rough rolled and rough cast plate | 6½d. |
| Figured Rolled, Oxford Rolled, Baltic, Oceanic, Arctic, Stippolyte, and small and large Flemish white | 6½d. |
| Ditto, tinted | 7½d. |
| Rolled Sheet | 6d. |
| White Rolled Cathedral | 6d. |
| Tinted do. | 6½d. |

## PAINTS, &c.

| | | £ s. d. |
|---|---|---|
| Raw Linseed Oil | in pipes per gallon | 0 8 0 |
| „ „ „ | in barrels „ | 0 8 4 |
| „ „ „ | in drums „ | 0 8 7 |
| Boiled „ „ | in barrels „ | 0 8 7 |
| „ „ „ | in drums „ | 0 9 0 |

Orders for these oils must be accompanied by a certificate from the Ministry of Food (Oil and Fat Department), St. Stephen's House, Westminster, S.W.1.

| | | | |
|---|---|---|---|
| Turpentine | in barrels | „ | 0 11 3 |
| „ | in drums | „ | 0 11 6 |
| Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.) | | | 60 10 0 |

GENUINE WHITE LEAD PAINT—

| | | |
|---|---|---|
| "Blackfriars," "Nine Elms," "Park," and other best brands (in 14 lb. tins) not less than 5 cwt. lots | per ton delivered | 83 10 0 |
| Red Lead, Dry (packages extra) | per ton | 47 0 0 |

Orders for White and Red Lead and any Paint containing Lead must be accompanied by a certificate or licence, which can be obtained from the Director of Materials [A.N. 2 (E.)], Hotel Victoria, S.W.

| | | |
|---|---|---|
| Best Linseed Oil Putty | per cwt. | 1 2 0 |
| Filocol | per cwt. | 0 16 6 |

## VARNISHES, &c.

| Per gallon. | £ s. d. |
|---|---|
| Fine Pale Oak | 0 16 0 |
| Pale Copal Oak | 0 17 0 |
| Superfine Pale Elastic Oak | 0 19 0 |
| Fine Extra Hard Church Oak | 0 18 0 |
| Superfine Hard-drying Oak, for seats of Churches | 1 1 0 |
| Fine Elastic Carriage | 0 19 0 |
| Superfine Pale Elastic Carriage | 1 1 0 |
| Fine Pale Maple | 0 14 0 |
| Finest Pale Durable Copal | 1 5 0 |
| Extra Pale French Oil | 1 4 0 |
| Eggshell Flatting | 1 0 0 |
| White Pale Enamel | 1 6 0 |
| Extra Pale Paper | 0 16 0 |
| Best Japan Gold Size | 0 12 0 |
| Best Black Japan | 0 16 0 |
| Oak and Mahogany Stain | 0 12 0 |
| Brunswick Black | 0 10 0 |
| Berlin Black | 0 16 0 |
| Knotting | 1 10 0 |
| French and Brush Polish | 1 0 0 |

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Wednesday.*

* Denotes *accepted.* † Denotes *provisionally accepted.*

‡ Denotes *recommended for acceptance.*

BURTON-ON-TRENT.—The Corporation has accepted the tender of Messrs. Hodge for the brickwork and that of Mr. Lambrick for the reinforced concrete work required for the extension of the tramways depot. The cost of the extension is estimated at £2,122.

H.M. OFFICE OF WORKS.—The following tenders were accepted during August:—

*Building Works.*—Attercliffe Employment Exchange, alterations and additions, Dawson & Jones (Sheffield), Ltd., Sheffield; Bromsgrove Employment Exchange, alterations, E. Crowder, Birmingham; Charterhouse Telephone Exchange, adaptation, Henry Kent, London, S.E.; Flax Factories, Pinchbeck, Holbeach, Peakirk & Thorney, de-seeding stations, John Thompson & Sons, Peterborough; Garston Employment Exchange, alterations, Haugh & Pilling, Liverpool; Hendon, ordinary works and repairs, W. Tout, Hendon; Kingsway, General Electric Company's Building, adaptation, W. J Maddison, Canning Town, E.; Liverpool, Allerton Towers, alterations, &c., Bullen Bros. & Sons, Liverpool; Northampton District, ordinary works and repairs, Edwin Archer, Northampton; Peterborough Flax Factory, de-seeding buildings and barns, John Cracknell, Peterborough; Regents Park, new canteen, Fred Pitcher, Ltd., London, N.; St. Helen's Employment Exchange, alterations, J. Lucas & Son, Prescot, Lancs.; Shepherd's Bush Employment Exchange, alterations, &c., Ford & Walton, Ltd., London, N.W.; Southall Employment Exchange, alterations and additions, J. E. Whiter, Newington Butts, S.E.; Yeovil Flax Factory, de-seeding buildings and barns, Bird & Pippard, Yeovil.

*Engineering Works.*—East Greenwich, H.M. Fuel Research Station, gas purifiers, Drakes, Ltd., Halifax; Glover West Retorts, West Gas Improvement Co., Ltd., Manchester; Water Gas Plant, Humphreys & Glasgow, London, S.W.; Flax Production, 15 h.p. motors, Thomas Berry, Edinburgh; Rams, John Blake, Ltd., Accrington; London County Hall, extension of heating on second floor, W. G. Cannon & Son, Southwark, S.E.; National Physical Laboratory, Teddington, heating of 7 ft. wind channel, Palowkar & Sons, Cheapside, E.C.

LONDON—For renewal of existing contracts with the Westminster City Council:—

*Limmer and Trinidad Lake Asphalte Co.—Carriage and footway repairs: Items 1 to 9 as at present..

*Improved Wood Pavement Co.—Wood pavement: Items 5, 6, 7, 8, 10 and 11, at 15 per cent. increase.

*Wakeley Bros. & Co.—Cement and lime: Item 1, at 5s. increase; and Item 2, as at present.

WAR OFFICE.—The following tenders were accepted by the War Office during August:—

*Works Services.—Erection of Buildings*: Bullen Bros. & Sons, Ltd., Liverpool; McCabe Bros., Dublin. *Maintenance of W.D. Buildings*: D. Creedon, Fermoy, co. Dublin. *Miscellaneous*: W. Bais & Co., Ltd., Coatbridge; W. Griffiths & Son (Liverpool), Ltd., Liverpool; E. Wallis & Sons, Ltd., Maidstone.

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Effect of Natural Stone. Waterproof
Any Painter can use it.
COATOSTONE DECORATION CO.
(Proprietors: The Stone Preservation Co., Ltd.)
9a, LITTLE JAMES ST., GRAY'S INN, LONDON, W.C.1

## THE DUNLOP ENDOWMENT AND EDUCATION SCHEMES.

THE conclusion of the first term of the Dunlop Rubber Company's Educational Scheme and the inauguration of a Staff Endowment Scheme were celebrated on September 6 at the Birmingham Temperance Hall, and we give some particulars of the scheme, as they may be of use to other large employers of labour. Mr. F. C. Baisley pointed out that the Dunlop Education and Endowment Scheme was essentially an encouragement scheme. It afforded facilities for education, and provided the strongest possible inducements to study in the shape of continuous promotion, constantly increasing salary, the assurance of a satisfactory career for life, and the benefit of an endowment at the age of fifty-five. In the Education Scheme advantage was taken of the Municipal Educational Institutions, and provision was made not only for intermediate and higher education but also for those who required preparation for admission to these studies. The syllabus of subjects included training in commercial subjects, engineering and pure science. The Staff Bureau, in consultation with the heads of departments and the headmasters of the schools and classes, advised students as to the subjects which could be most profitably studied in relation to the business of the Company by each individual. To each student, therefore, on achieving success, promotion was practically assured. Although the scheme was inaugurated only in January last, when in most of the schools and classes the full year's course had been half completed, yet out of 200 students enrolled 120 were prize winners. Some of the prizes would be accompanied by immediately increased salaries, and in all cases the individual success would be indexed and cross-indexed by the Staff Bureau in such a way as to ensure recognition when the opportunity for promotion occurred. The policy of the directors was to secure and to retain the services of men and women, youths and girls of ability, and give them every encouragement and facility to advance.

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BETHNAL GREEN, LONDON, E.

## NEW COMPANIES.

THE particulars quoted below have been compiled by Jordan & Sons, Ltd., Company Registration Agents, of 116 and 117, Chancery-lane, W.C. 2, from the documents available at the Companies Registry:—

A. W. RICHARDSON & SON, LTD. (151,301). Registered August 28. To carry on the business of a mechanical, electrical and general engineer. Nominal capital £10,000.

C. E. F. SYNDICATE, LTD. (151,353.) 53, York-street, Westminster. Registered September 4, 1918. The objects of the agreement are to acquire and work in the United Kingdom certain patent rights in connection with furnaces and heating apparatus. Nominal capital, £1,000.

JAMES BURLEY & Co., LTD. (151,348.) Registered September 3, 1918. To carry on the business of metal workers, brassfounders, ironfounders, tool makers, &c. Nominal capital, £500.

NORTH END COLLIERY (COCKFIELD), LTD. County-chambers, Middlesbrough, North Riding, Yorkshire. Registered August 2, 1918. To carry on the business of manufacturers of bricks, tiles, pipes, pottery, earthenware, china, and terra-cotta ware. Nominal capital £7,500.

THE LONDON & LANCASHIRE FIRE INSURANCE COMPANY LTD

Premiums - - £3,497,074
Reserve Funds - £4,078,996

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EMPLOYERS' LIABILITY.
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